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Carbon Taxation by Regulation

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Article

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I. INTRODUCTION

In discussions about climate change, a national tax on carbon-producing activities is often favored over other carbon-reduction approaches because it is seen as efficient, fair, and straightforward.[1] Politicians on both the left and right tout a carbon tax as a Hail Mary-type solution.[2] MIT and University of

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1. Classic articles advocating for a carbon tax over alternative emissions regulation approaches such as cap-and-trade include: Michael Hoel & Larry Karp, *Taxes Versus Quotas for a Stock Pollutant*, 24 RESOURCE & ENERGY ECON. 367 (2002); Larry Karp & Jiangfeng Zhang, *Regulation of Stock Externalities with Correlated Abatement Costs*, 32 ENVTL. & RESOURCE ECON. 273 (2005); William D. Nordhaus, *To Tax or Not To Tax: Alternative Approaches to Slowing Global Warming*, 1 REV. ENVTL. ECON. & POL'Y 26 (2007); Marc J. Roberts & Michael Spence, *Effluent Charges and Licenses Under Uncertainty*, 5 J. PUB. ECON. 193 (1976); Martin L. Weitzman, *Prices vs. Quantities*, 41 REV. ECON. STUD. 477 (1974).

2. For advocates on the left, see ALISON CASSADY ET AL., CTR. FOR AM. PROGRESS, BUILDING A 21ST CENTURY ECONOMY: THE CASE FOR A PROGRESSIVE CARBON TAX (2016), https://www.americanprogress.org/issues/green/reports/2016/12/16/295181/building-a-21st-century-economy; David Roberts, *A Chat with Al Gore on Carbon Taxes, Natural Gas, and the "Morally Wrong" Keystone Pipeline*, GRIST (Nov. 20, 2012), http://grist.org/climate-energy/a-chat-with-al-gore-on-carbon-taxes-natural-gas-and-the-morally-wrong-keystone-pipeline. Advocates on the right include: JAMES A. BAKER, III ET AL., CLIMATE LEADERSHIP COUNCIL, THE CONSERVATIVE CASE FOR CARBON DIVIDENDS (2017), https://www.clcouncil.org/media/TheConservativeCaseforCarbonDividends.pdf; Martin S. Feldstein et al., Opinion, *A Conservative Case for Climate Action*, N.Y. TIMES (Feb. 8, 2017), http://www.nytimes.com/2017/02/08/opinion/a-conservative-case-for-climate-action.html; Bob Inglis & Arthur B. Laffer, Opinion, *An Emissions Plan Conservatives Could Warm To*, N.Y. TIMES (Dec. 27, 2008), http://www.nytimes.com/2008/12/28/opinion/28inglis.html. A number of

Chicago economists maintain that adoption of a national carbon tax could be necessary to reduce societal reliance on fossil fuels and meet greenhouse-gas-reduction targets,[3] such as the United States' goal of eighty percent greenhouse reduction by 2050.[4] Elon Musk has even taken the position that a carbon tax is as necessary to successful carbon reduction as garbage collection fees are to trash disposal.[5] Of course, there is a lot to debate about the design of a carbon tax,[6] but it stands out for its simplicity and elegance.[7]

In the United States, a carbon tax has also proved politically elusive. Legislative adoption of a national carbon tax is widely considered infeasible and is stalled, at least for the foreseeable future[8]—though a few scattered efforts to tax energy based on its carbon attributes have been adopted at subnational levels of

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private corporations, including some in the fossil fuel sector, have also voiced support for a national carbon tax. *See* Editorial, *Even Big Oil Wants a Carbon Tax*, BLOOMBERGVIEW (June 1, 2015), http://origin-www.bloombergview.com/view/articles/2015-06-01/even-big-oil-wants-a-carbon-tax (noting that six of the world's largest oil companies have come out in support of a carbon tax).

3. *See* Thomas Covert et al., *Will We Ever Stop Using Fossil Fuels?*, 30 J. ECON. PERSP. 117, 120 (2016) (arguing that certain policy choices are necessary to reduce fossil fuel consumption and greenhouse gas emissions).

4. This is the target the United States set in its submission and pledge to the Paris Summit. *See* Simon Evans, *U.S. Climate Pledge Promises To Push for Maximum Ambition*, CARBONBRIEF (Mar. 31, 2015), https://www.carbonbrief.org/us-climate-pledge-promises-to-push-for-maximum-ambition.

5. *See* Alan Boyle, *Elon Musk Explains Why a Carbon Tax Is as Necessary as Garbage Collection Fees*, GEEKWIRE (Dec. 15, 2015), https://www.geekwire.com/2015/elon-musk-explains-carbon-tax-necessary-garbage-collection-fees.

6. For an excellent discussion of some of the core components of an optimal carbon tax design, see Gilbert E. Metcalf & David Weisbach, *The Design of a Carbon Tax*, 33 HARV. ENVTL. L. REV. 499 (2009) (addressing the tax rate, distributional issues, and a need to address jurisdictional spillover effects through border adjustments).

7. *See* Editorial, *Carbon Tax Is Best Option Congress Has*, WASH. POST (May 7, 2013), https://www.washingtonpost.com/opinions/carbon-tax-is-best-option-congress-has/2013/05/07/883f2184-aeaa-11e2-98ef-d1072ed3cc27_story.html (describing a carbon tax as "an elegant policy Congress could immediately take off the shelf" and "one of the best ideas in Washington almost no one in Congress will talk about"); *see also* SHI-LING HSU, THE CASE FOR A CARBON TAX 10 (Island Press 2011).

8. One significant reason for this is the geographic obstacles presented by the Senate, which also have hobbled efforts to move forward with other carbon regulation initiatives. *Cf.* Metcalf & Weisbach, *supra* note 6, at 503, 555. Another reason relates to a lack of widespread voter support, due to a lack of psychological appeal. *See* Gary M. Lucas, Jr., *Voter Psychology and the Carbon Tax*, 90 TEMPLE L. REV. (forthcoming 2017), https://papers.ssrn.com/sol3/papers2.cfm?abstract_id=2915339.

government.[9] Many scholars favor a carbon tax over other policy approaches, such as cap-and-trade.[10]

While spirited, mainstream policy discussions about carbon taxation consistently ignore how energy regulation can, and in fact already does, effectuate some of the same goals as a carbon tax. This Article begins to fill that gap by advancing carbon taxation by regulation—widespread and growing use of customer rate subsidies in energy law that already operate in a similar manner and serve parallel public goals to a carbon tax. Part of this endeavor is descriptive, and aims to show how energy regulation already embraces forms of taxation as one of its primary regulatory tools in rate setting. This paper also advances a normative claim: energy law can better promote efficiency and social welfare by aligning the features of internal customer subsidies with the same principles that would inform design of a carbon tax. While customer rate subsidies, on their own, cannot provide all of the same benefits as a national tax that internalizes the externalities of all carbon-producing activities, a carbon tax offers a benchmark for evaluating the efficacy of these internal subsidies.

In *Taxation by Regulation*, published nearly half a century ago, Richard Posner questioned the common conceptual and operational separation between two important, yet often distinct, government functions: regulation and taxation.[11] He argued that one of the core functions of economic regulation is to perform distributive and allocative tasks, similar to those typically relegated to tax policy.[12] Cutting against economists and regulators who understand regulation as protecting consumers, mimicking the result of a competitive market, or enriching regulated firms, Posner observed that internal subsidies in utility rates can "be viewed as an exertion of state power whose purpose, like that of other taxes, is to . . . support a service that the market would

9. The idea of a carbon tax has not had significant political traction in states either. For discussion of state carbon tax initiatives, see ADELE C. MORRIS ET AL., BROOKINGS, STATE-LEVEL CARBON TAXES: OPTIONS AND OPPORTUNITIES FOR POLICYMAKERS (2016), https://www.brookings.edu/wp-content/uploads/2016/07/State-level-carbon-taxes-Options-and-opportunities-for-policymakers.pdf.

10. *See* sources cited *supra* note 1.

11. *See* Richard A. Posner, *Taxation by Regulation*, 2 BELL J. ECON. & MGMT. SCI. 22 (1971) (noting that utility regulation can provide many of the same public good and redistribution functions as traditional forms of public taxation).

12. *Id.* at 23.

provide at a reduced level, or not at all."[13] Though he did not set out to defend taxation by regulation, he identified some benefits it offers over alternative methods of financing public goods (such as general taxation of income or activities), including its ease of administration, legislative feasibility, protection of expectations, and propensity for justice.[14]

In approaching climate policy, carbon taxation by regulation presents an immediate opportunity to advance many of these same benefits. Many scholars have sought to excavate the progressive ideals of public utility regulation as a way to promote important public goods for energy (such as consumer protection[15] and reliability[16]) and the environment (such as carbon reduction[17]). My goal here is not to embrace carbon taxation by regulation as a backdoor way of achieving progressivity in climate policy. Rather, this Article argues that many efforts to effectuate carbon reduction are already embedded in the tools of modern energy regulation. I present examples that demonstrate how established approaches to setting customer energy rates can advance carbon reduction goals through traditional utility regulation—an approach that should be embraced, not ignored, in policy discussions surrounding climate change. To date, however, these approaches have not achieved their full potential, and many customer subsidies work at cross-purposes. Using optimal design of a carbon tax as a benchmark, I also identify some principles to help guide the reform of customer rate setting and to maximize its effectiveness, efficiency, and customer-welfare benefits in the transition to a low-carbon energy sector.

Part II of this Article illustrates how decades of unaligned approaches to taxation and regulation have contributed to substantial carbon lock-in in the energy sector. It will be a daunting challenge for the United States to meet its carbon reduction targets, for which some estimate new investment costs as high as

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13. *Id.* at 29.

14. *Id.* at 45–47.

15. *See* Jim Rossi, *The Common Law "Duty To Serve" and Protection of Consumers in an Age of Competitive Retail Public Utility Restructuring*, 51 VAND. L. REV. 1233, 1241 n.27 (1998) (emphasizing how ratemaking helped to finance consumer protection as a public good).

16. *See* Emily Hammond & David B. Spence, *The Regulatory Contract in the Marketplace*, 69 VAND. L. REV. 141, 163–66 (2016) (emphasizing that reliability is a public good that is not properly priced in interstate power markets).

17. *See generally* William Boyd, *Public Utility and the Low-Carbon Future*, 61 UCLA L. REV. 1614 (2014) (arguing that carbon-reduction efforts can be advanced by looking back to progressive ideas from the early twentieth century).

six trillion dollars.[18] No one, including staunch advocates of a carbon tax, expects government to pay for the new infrastructure investment that will be required in the decades to come.[19] Novel and creative approaches to financing new power generation investments from the private sector will prove important to this power supply shift. However, market prices in energy often fail to reflect actual value.[20] Many of the public goods associated with carbon reduction and grid reliability are under-produced by private energy markets.[21]

But while Congress has been mired in the status quo, energy regulators have not stood still. Rather, federal and state energy regulators have drawn creatively on established customer rate-setting tools to begin to transition the energy sector towards a low-carbon future. Part III describes how many state and federal policies adopted over the past few decades endorse the use of ratepayer subsidies (what, following Posner, I call internal subsidies) to promote the impending transition to deep decarbonization, even without a carbon tax.[22] Federal tax incentives for resources like wind power have played some role in steering

18. *See* Geoffrey Heal, *What Would It Take To Reduce U.S. Greenhouse Gas Emissions 80% by 2050?* 2 (Nat'l Bureau of Econ. Research, Working Paper No. 22525, 2016), http://www.nber.org/papers/w22525. Put in context, this cost is achievable over a period of decades, as it represents less than half of the United States' current annual gross domestic product. *See id.*; *see also* WORLD BANK, WORLD DEVELOPMENT INDICATORS DATABASE 1 (Apr. 17, 2017), http://databank.worldbank.org/data/download/GDP.pdf (listing the United States' 2016 GDP at roughly $18.57 trillion).

19. Most do not envision a carbon tax as an allocation of new dollars to the public fisc to finance government-owned infrastructure investments, but as something that would be used to lower taxes or to fund grants or loans for private clean-energy investments. *See* Editorial, *The Case for a Carbon Tax*, N.Y. TIMES (June 6, 2015), https://www.nytimes.com/2015/06/07/opinion/the-case-for-a-carbon-tax.html.

20. Long ago, economists including John Commons and Robert Lee Hale argued that price regulation needs to address the disparity between market (or nominal) prices and real value. *See, e.g.*, JOHN COMMONS, INSTITUTIONAL ECONOMICS 225–26 (1934); Robert L. Hale, *Bargaining, Duress, and Economic Liberty*, 43 COLUM. L. REV. 603, 625–26 (1943); *see also* BARBARA H. FRIED, THE PROGRESSIVE ASSAULT ON LAISSEZ FAIRE: ROBERT HALE AND THE FIRST LAW AND ECONOMICS MOVEMENT (2001) (providing further insight into the work of Robert Lee Hale).

21. *Cf.* Hammond & Spence, *supra* note 16.

22. I focus primarily on the electric power grid as a means for doing this, in part because with any transition to vehicle electrification the electric sector is expected to increase carbon emissions and absorb many of the carbon impacts presently associated with the use of fossil fuels in the transportation sector.

investments, but represent only a portion of total subsidies promoting investment in clean-energy infrastructure.[23] Mandates such as renewable portfolio standards (RPSs) influence energy investment decisions in more than half the states.[24] And for regulated utilities, these kinds of mandates are subsidized through rate increases.[25] Retail customer charges, including time-of-day rates and billing approaches like net metering, have also influenced customer demand and reduced the need for large-scale power generation.[26] These mandates and charges reflect ratepayer subsidies that support new carbon-abatement efforts and investments in clean-energy technology. They have widespread acceptance and, in effect, lay the groundwork for a type of below the radar carbon tax—albeit in a fragmented way.[27]

Absent adoption of a national carbon tax, continuation and expansion of internal subsidies will prove necessary for grid decarbonization. However, their full potential will not be achieved without some reforms. Regulators routinely approve internal subsidies on an incremental basis, assessing them in isolation based on their effects on ratepayers and efficiency. However, given the interstate nature of modern energy markets, to successfully advance carbon reduction without presenting market distortions, inefficiencies, and harms to consumers, the efficacy of various forms of subsidies must be evaluated side by side, better coordinated between regulators, and scaled-up and recalibrated. Part IV uses the optimal design of a carbon tax to identify some basic principles to help guide the reform of internal subsidies. These include some need to address revenue shortfalls for public goods and the efficiency of burden spreading, to promote fairness and notions of equity (both horizontal and vertical), to minimize market distortions, and to mitigate regulatory spillovers and arbitrage.

Part IV, also advances a menu of policy reforms to better advance carbon taxation by regulation in a principled manner. State regulators should not shy away from forms of carbon taxation by regulation, even in interstate power markets, but they should consider use of innovative approaches to customer subsidies and be more attentive to coordinating the jurisdictional

23. *See infra* Part II.B.
24. *See infra* Part III.A.
25. *See infra* Part III.A.
26. *See infra* Part III.C.
27. *See infra* Part III.C.

spillover effects of internal subsidies. Recalibrating internal subsidies to meet carbon-reduction targets could also benefit from policy shifts by the federal government. Even absent new legislation from Congress, the executive branch already possesses significant authority to design better policies to align the internal subsidies of regulation with carbon tax benchmarks; agencies such as the Federal Energy Regulatory Commission (FERC) also face a propitious opportunity to embrace new kinds of internal subsidies (for example, drawing on an excise tax for electric power transmission) to ensure that interstate energy markets better advance important public goods, including reliability and carbon reduction, on a nondiscriminatory basis. At the same time, clearer federal policies are needed to encourage more private investment in low-carbon energy infrastructure, subnational innovations, and better inter-governmental coordination.[28] Even as Congress and the executive branch table ambitious national carbon-reduction requirements, energy regulators are already pursuing carbon taxation by regulation in an incremental, fragmented, and uncoordinated manner. It is time to recognize the significance of internal subsidies in climate change policy and to identify the principles that can help to unleash their full potential for efficiency and social welfare.

II. THE INERTIA OF CARBON LOCK-IN

The U.S. energy system suffers from "carbon lock-in,"[29] which will substantially impede the future transition to low-carbon energy supply. In 2016, carbon dioxide emissions by the electric power sector accounted for thirty-five percent of U.S. energy-

28. For a discussion of the promise of setting floors for clean energy policy, see Jim Rossi & Thomas Hutton, *Federal Preemption and Clean Energy Floors*, 91 N.C. L. REV. 1283 (2013).

29. As Gregory Unruh describes:

> [I]ndustrial economies have become locked into fossil fuel-based technological systems through a path-dependent process driven by technological and institutional increasing returns to scale. This condition, termed carbon lock-in, arises through a combination of systematic forces that perpetuate fossil fuel-based infrastructures in spite of their known environmental externalities and the apparent existence of cost-neutral, or even cost-effective, remedies. Rational corrective policy actions in the face of climate change would include removal of perverse subsidies and the internalization of environmental externalities arising from fossil fuel use.

Gregory C. Unruh, *Understanding Carbon Lock-In*, 28 ENERGY POL'Y 817, 817 (2000).

related emissions.[30] Ninety-eight percent of these emissions came from natural gas and coal power plants.[31]

To a large degree, carbon lock-in is the unintended consequence of decades of stable governmental policies supporting incumbent energy resources.[32] For most of the twentieth century, tax incentives for fossil fuel production and widespread use of internal subsidies in utility rates together worked to give customers low-cost, reliable energy, while also protecting investors in power plants that burn fossil fuels.[33] Though independent in their design, both tax and internal subsidies continue to sustain a dated legacy of fossil fuel plants, comprising the bulk of energy-supply resources.[34] Recent policies favoring competitive interstate energy markets also prolong carbon lock-in by allowing grid operators to prioritize dispatch of the lowest-cost sources of energy, regardless of carbon-reduction attributes.[35] These governmental and market policies underscore the need for some principled strategy to overcome the inertia of carbon lock-in while also promoting public goods (such as carbon reduction) that energy markets do not presently value—one of the most significant benefits offered by a carbon tax.

A. TAX SUBSIDIES FOR THE FOSSIL FUEL LEGACY

Past and ongoing federal tax policies reinforce fossil fuel power generation by influencing investments in incumbent power plants, oil and gas production fields and processing facilities, and tens of thousands of miles of energy transportation infrastructure, such as pipelines and existing transmission lines.[36] Though renewable resources like wind have received significant

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30. *See How Much of U.S. Carbon Dioxide Emissions Are Associated with Electricity Generation?*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/tools/faqs/faq.php?id=77&t=11 (last updated May 10, 2017).

31. *See id.*

32. *See* Unruh, *supra* note 29, at 824 (discussing government policies that have made investing in electric power plants appealing).

33. *See infra* Part II.A.

34. *See infra* Part II.A.

35. *See infra* Part II.C.

36. *See generally* NAT'L RESEARCH COUNCIL, EFFECTS OF U.S. TAX POLICY ON GREENHOUSE GAS EMISSIONS (William D. Nordhaus et al. eds., 2013), https://www.nap.edu/read/18299/chapter/1 (analyzing the results of a study looking at the United States' tax policy and its effect on greenhouse gas emissions); Tracey M. Roberts, *Picking Winners and Losers: A Structural Examination of Tax Subsidies to the Energy Industry*, 41 COLUM. J. ENVTL. L. 63 (2016) (discussing the history of tax subsidies available to the energy sector and the ways in which they support fossil fuel power generation).

tax subsidies in recent years,[37] the Energy Information Administration (EIA) estimates that federal direct subsidies for fossil fuels in the United States continue to total around 3.4 billion dollars (in 2013 dollars).[38] Direct ongoing financial transfers benefitting fossil fuel resources include, inter alia, artificially low governmental fees for use of public mineral rights, subsidies to the transportation sector and to waterways and ports, tax-exempt debt, and longstanding favorable corporate tax treatment for oil and gas exploration and production (reducing the fuel costs associated with power generation from these sources).[39]

While significant on their own terms, these dollar amounts of direct subsidies for fossil fuels significantly understate their economic significance for investment in the electric power sector. Decades of stable tax incentives have not only lowered asset and operational costs for fossil fuel resources; the stability of fossil fuel tax policy has created reliable expectations for investors, reducing uncertainty and risks surrounding fossil fuel resource development and use (which translates into a lower cost of capital).[40] To the extent past infrastructure investment, such as power-generation facilities and pipelines or transmission lines (many located to provide fuel for and transport electricity from fossil fuel power plants), has benefited from past tax subsidies, a legacy of tax incentives continues to promote favorable production costs for legacy fossil fuel power plants.[41]

Longstanding and stable tax benefits for fossil fuels have also reduced the risks and costs of capital for electric utilities that rely predominantly on fossil fuel resources, giving them an advantage over non-incumbent power projects that do not burn fossil fuels—especially those facing high front-end construction costs. The oil depletion allowance in U.S. tax law (allowing companies to treat oil in the ground as capital equipment for tax depreciation purposes) began in 1913 and continues to this day, providing value in the form of a predictable and consistent low-

37. *See infra* Part III.B.

38. *See Total Energy Subsidies Decline Since 2010, With Changes in Support Across Fuel Types*, U.S. ENERGY INFO. ADMIN. (Mar. 13, 2015), https://www.eia.gov/todayinenergy/detail.php?id=20352 [hereinafter *Total Energy Subsidies Decline*].

39. *See* Roberts, *supra* note 36, at 75–103 (discussing the tax landscape for both fossil fuel resources and renewable energy resources, and the market response to that landscape).

40. *Cf.* Unruh, *supra* note 29, at 823 (discussing the risk-averse nature of investors, which favors incumbent power generators).

41. *Id.*

tax investment climate for fossil fuel producers.[42] This not only advantages producers, it also benefits the operators of power plants that burn their fuels. Fossil-fuel-producing master limited partnerships enjoy substantial federal tax benefits that are not available to wind or solar energy power project developers under current law.[43] In addition, utilities (which pay income tax at the federal level, but often are allowed to pass through their costs to ratepayers in retail rates) have been able to use accelerated tax depreciation of new power plants to generate tax benefits for a project in its early years of operation.[44] This can serve as a tax-free loan of sorts, which benefits investors in utilities with incumbent power-generation facilities to the extent that the utility's customer rate base (as approved by state regulators) can depreciate power generation assets at a slower pace and receive a reliable rate of return that may not be available to other non-utility project developers seeking accelerated tax depreciation.[45] These tax incentives provide financial stability for many past power-plant investments and prolong a utility's economic incentives to keep its legacy plants in operation long after their actual costs have been recovered.[46]

Moreover, estimates of subsidies available to fossil fuel energy resources fail to recognize the social costs associated with different energy resources. The environmental consequences of continuing to use high-carbon energy-supply sources are rarely

42. *See* Rebecca Leber, *Happy 100th Birthday, Big Oil Tax Breaks*, THINKPROGRESS (Mar. 1, 2013), https://thinkprogress.org/happy-100th-birthday-big-oil-tax-breaks-3c9731c4bc85.

43. David C. Magagna, Comment, *Congress, Give Renewable Energy a Fair Fight: Passage of the Master Limited Partnerships Parity Act Would Give Renewable Energy the Financial Footing Needed To Independently Succeed*, 27 VILL. ENVTL. L.J. 149, 150–51 (2016) ("In enacting favorable tax treatment for fossil fuel companies, Congress specifically neglected to extend the same benefits to renewable energy companies.").

44. *See* Roberts, *supra* note 36, at 99 n.243 (discussing the first-year bonus depreciation allowance in investment tax credits).

45. *See, e.g.*, *id.* at 75–81 (focusing on the accelerated cost recovery provided by fossil fuel tax subsidies).

46. *See, e.g.*, PUB. UTIL. COMM'N OF OR. STAFF, TREATMENT OF INCOME TAXES IN UTILITY RATEMAKING 13 (2005), http://www.puc.state.or.us/leg/sb408/white/taxpaper.pdf (discussing Oregon's method of calculating income taxes for utility ratemaking, and the benefits of the current system for utilities); *see also* Roberts, *supra* note 36, at 137–38 (emphasizing differences in the tax environment for legacy energy resources, in comparison to new renewable power sources).

priced into investments decisions.[47] Focusing on only the economic benefits of tax subsidies fails to account for the possibility that different energy resources produce different public goods because they have different externalities. When taking this social cost into account, the International Energy Agency estimates that global fossil fuel subsidies outstrip subsidies for renewable energy nearly ten-fold.[48] The International Monetary Fund similarly notes that when the social cost of carbon is accounted for, worldwide fossil fuel subsidies amount to five trillion dollars per year.[49] There is little doubt that past and present fossil fuel subsidies play a significant role in encouraging the development of fossil fuel resources and their widespread use in transportation and electric-power generation.[50] Continued presence of many tax subsidies for fossil fuel resources underscores a critical need for policymakers to reassess whether the current investment environment remains advantageous to the fossil fuel energy producers and their legacy infrastructure in comparison to lower-carbon alternatives.

B. RATEMAKING AND THE EXISTING POWER GENERATION FLEET

Beyond tax subsidies, state regulators' traditional approach to setting retail rates based on the utility's cost-of-service has allowed routine recovery of power-supply costs in the customer rate base. While many states have moved to the competitive pricing of energy, the approach to utility ratemaking that most states continue to embrace allows a utility to recover expenses from ratepayers in the form of just and reasonable rates, based on the costs (including capital costs) of providing service to

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47. *See* Hammond & Spence, *supra* note 16, at 171–72 (discussing the difficulty in pricing environmental externalities).

48. Giles Parkinson, *The Myth About Renewable Energy Subsidies*, CLEANTECHNICA (Feb. 25, 2016), https://cleantechnica.com/2016/02/25/the-myth-about-renewable-energy-subsidies.

49. *Id.* Studies that incorporate environmental and energy security costs associated with fossil fuels in the United States estimate that annual direct and indirect subsidies exceed $121 billion (in 1999 dollars). Doug Koplow & John Dernbach, *Federal Fossil Fuel Subsidies and Greenhouse Gas Emissions: A Case Study of Increasing Transparency for Fiscal Policy*, 26 ANN. REV. ENERGY & ENV'T 361, 366 (2001).

50. *Cf.* Parkinson, *supra* note 48 (explaining that fossil fuels have enjoyed stable government subsidies, whereas renewable energies receive inconsistent and ever-changing subsidization).

them.[51] In approving expensive new power plants as prudent investments, rate regulators have consistently favored least-cost resources based on current economic conditions, often approving plants with excess capacity in order to accommodate projected growth in customer demand without any serious consideration of the environmental consequences.[52]

Economists have long questioned the economic inefficiencies produced by cost-of-service ratemaking, which can distort asset investment decisions by perversely encouraging overinvestment in large-scale baseload (that is, must-run) power plants with high fixed costs (known among economists as the "Averch-Johnson" effect, or an inefficiently high capital-to-labor ratio).[53] Over the past half century, state regulators routinely approved new fossil fuel and nuclear plants, with an expectation of continued expansion of customer demand.[54] This encouraged construction of an existing electric power generation fleet (supported by a network of transmission lines) that obtains roughly sixty-four percent of its energy from fossil fuels and nearly twenty percent from nuclear power.[55] Lower-carbon resources lag these more conventional power generation facilities by a significant margin, with non-hydroelectric renewables (such as wind, solar, and biomass) supplying only eight percent of electric power needs,[56] at least on their best day.[57] Vertical integration of the utility also

51. *See* Hammond & Spence, *supra* note 16, at 150–51 (discussing utility rate regulation).

52. This is a very real and continuing problem for the energy sector. *See* Ivan Penn & Ryan Menezes, *Californians Are Paying Billions for Power They Don't Need*, L.A. TIMES (Feb. 5, 2017), http://www.latimes.com/projects/la-fi-electricity-capacity (describing overinvestment in natural gas plants, most approved over the past decade).

53. *See* Harvey Averch & Leland L. Johnson, *Behavior of the Firm Under Regulatory Constraint*, 52 AM. ECON. REV. 1052, 1068 (1962). For a discussion of how state prudency review led to an overcapacity problem with baseload plants, see generally Richard J. Pierce, Jr., *The Regulatory Treatment of Mistakes in Retrospect: Canceled Plants and Excess Capacity*, 132 U. PA. L. REV. 497 (1984).

54. For an example of the problem, see Penn & Menezes, *supra* note 52.

55. *See What Is U.S. Electricity Generation by Source?*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/tools/faqs/faq.php?id=427&t=3 (last updated Apr. 18, 2017).

56. The EIA estimates coal and natural gas comprise sixty-four percent of the United States' electricity generation in 2016. *See id.*

57. The on-their-best-day qualifier is important because looking at the overall production potential of various power generation facilities is not an apples-to-apples comparison: the capacity factor (or predicted annual output, based on the percentage of time the facility is producing energy) for wind and solar resources is significantly lower than baseload power plants, including

favored investment in centrally-located power-generation facilities, leading to underinvestment in the interstate transmission grid to transport energy produced by other suppliers.[58]

State and federal energy regulators' primary focus on promoting low-cost and dependable sources of energy, as they approve new plants and pass the costs through in customer rates, continues to exercise a firm grip over the existing power-supply fleet. Today, many fossil fuel resources and a large number of nuclear power plants no longer operate at a profit to their investor.[59] Some of these sources are being retired, though many plants operate at less-than-full generation capacity, with firms increasingly looking to ratepayer subsidies to keep their plants in operation, often for reliability purposes.[60] Transmission-grid-reliability regulations also routinely favor baseload power plants—most fueled by coal and natural gas—though little serious attention is given to how other energy resources, such as wind power, distributed power generation, or demand response, might also promote reliability.[61] Ongoing recovery for the stranded costs associated with existing coal and nuclear plants threatens to keep legacy power plants in operation decades beyond their originally-expected useful life, delaying any transition towards grid decarbonization.[62] Significantly too, traditional approaches to utility ratemaking fixate on customer protection to the exclusion of other important public goods, such

those using coal and many using natural gas. *Compare Electric Power Monthly: Table 6.7.A. Capacity Factors for Utility Scale Generators Primarily Using Fossil Fuels, January 2013–June 2017*, U.S. ENERGY INFO. ADMIN. (Aug. 24, 2017), https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_6_07_a, *with Electric Power Monthly: Table 6.7.B. Capacity Factors for Utility Scale Generators Primarily Using Fossil Fuels, January 2013–June 2017*, U.S. ENERGY INFO. ADMIN. (Aug. 24, 2017), https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_6_07_b.

58. For discussion of how traditional rate regulation led to underinvestment in the grid and overinvestment in baseload power supply, see JIM ROSSI, REGULATORY BARGAINING AND PUBLIC LAW 54–61 (2005).

59. *See* Hammond & Spence, *supra* note 16, at 159–63 (discussing the sometimes higher-than-anticipated energy production costs for certain energy producers).

60. A couple examples are highlighted in Penn & Menezes, *supra* note 52; *see also* Hammond & Spence, *supra* note 16 (detailing the importance of reliability in the electricity generation market).

61. *See, e.g.*, Hammond & Spence, *supra* note 16 (discussing the perceived poor reliability attributes of non-dispatchable resources, such as solar and wind power, in comparison to traditional fossil-fueled and nuclear base load plants).

62. *See* Emily Hammond & Jim Rossi, *Stranded Costs and Grid Decarbonization*, 82 BROOK. L. REV. 645, 646–47 (2017).

as energy conservation.[63] By treating forecasted customer load as a given, or systematically erring in the direction of overestimating demand growth, ratemaking has promoted wasteful consumption of electric power, rather than energy conservation.

Put simply, cost-of-service ratemaking for electric power encourages a utility to maximize its revenue, which under traditional approaches requires it to sell more energy.[64] Without attention to rate design[65] and decoupling,[66] utilities traditionally face no incentive to sell less energy, let alone to price the retail sale of energy in a manner that reflects its broader social costs rather than the financial costs of production.[67] Many utilities continue to charge retail customers flat rates (that is, a constant price for each kilowatt hour (kWh) consumed), rather than vary customer rates based on peak time-of-day or seasonal constraints on the energy system. Utilities have little or no incentives to sell less power or to pursue goals unrelated to maximizing customer revenue, which depends on total energy sales.[68] Any successful transition to deep decarbonization must be attentive to customer demand and, in particular, how the pricing of energy impacts the demand for energy. Part of the hope behind a carbon tax is that pricing the carbon consequences of energy resources into the production of energy will be passed on to customers and will, at least to some degree, affect their purchase decisions, reducing demand for energy and the need for future investments in power supply.[69]

C. PUBLIC GOOD CHALLENGES IN COMPETITIVE ENERGY MARKETS

Over the past twenty-five years the focus of federal energy policy has shifted from relying on energy subsidies to pay for various public goods associated with energy (such as grid reliability), to relying on competitive energy markets to provide them. In theory, federal market policies would allocate energy resources, price them, and set their investment incentives based

63. *See, e.g.*, Penn & Menezes, *supra* note 52.

64. *See, e.g.*, Michael P. Vandenbergh & Jim Rossi, *Good for You, Bad for Us: The Financial Disincentive for Net Demand Reduction*, 65 VAND. L. REV. 1527, 1545–46 (2012).

65. For discussion, see *infra* Part III.C.

66. For discussion, see *infra* Part III.A.2.

67. *See* Vandenbergh & Rossi, *supra* note 64.

68. *See id.*

69. *See, e.g., id.*

on how a competitive market matches supply and demand.[70] However, the reality of competitive energy markets does not match the theory. Energy resource market prices do not always reflect externalities, positive or negative. As others have observed, competitive interstate energy markets have failed to price important public goods, such as the reliability and environmental attributes associated with various energy resources.[71]

FERC's initiative to promote wholesale competition in the pricing of bulk power supply requires "open access" to interstate transmission lines on nondiscriminatory terms.[72] In the most-populous areas of the United States today, private Regional Transmission Operators (RTOs) coordinate bulk-power-supply transactions.[73] FERC regulates these RTOs to ensure that wholesale energy prices are just and reasonable, typically by policing whether a supplier possesses market power and enforcing rules to protect against fraudulent transactions.[74] RTO grid operators play a role similar to air traffic controllers, applying rules and guidelines to coordinate various power flows in order to maintain a stable and reliable power grid as the supply and demand for energy allows market prices to clear.[75]

Like other markets, however, allocating energy supply in a competitive interstate power market with open access to transmission favors the lowest cost, incumbent power generators over newer, and more expensive resources.[76] Most RTO grid operators prioritize and dispatch energy resources on a least-cost basis.[77] In this sense, market pressures continue to favor energy-supply resources that have ready transmission-grid access and the lowest marginal operational (and fuel) costs—for many areas of the country, existing baseload resources such as coal and natural-gas plants.[78] By contrast, most new low-carbon energy resources can only come online once they have incurred high front-

70. The Federal Power Act (FPA) delegates to FERC the regulation of interstate wholesale energy markets and electricity transmission. 16 U.S.C. § 824(a) (2012). Under the FPA, states retain authority over power distribution and generation facilities and retail rates. *See id.* § 824(b)(1).

71. *See* Hammond & Spence, *supra* note 16.

72. Order No. 888, FERC Stats. & Regs., 75 FERC ¶ 31,036, 18 C.F.R. pts. 35 & 385 (1995), *aff'd*, New York v. FERC, 535 U.S. 1 (2002).

73. *See* Hammond & Spence, *supra* note 16, at 153.

74. *See id.* at 194.

75. *See id.* at 153.

76. *See id.* at 154–55.

77. *See id.* at 193.

78. For a discussion, see *id.* at 154–57.

end fixed costs and already have access to transmission—and they are often seen as intermittent in their ability to deliver energy in any event.[79]

The transition to competitive energy markets makes the distortions presented by traditional federal tax incentives and traditional regulatory subsidies even more significant. Often, energy markets leave important public goods, such as customer reliability and environmental protection, unaddressed. A legacy of past investment decisions favoring incumbent energy suppliers can obfuscate attention to these public goods. It is expected that the transition to a low-carbon energy system will lead to a decrease in expected investments in traditional fossil fuel plants and their operation, somewhere in the range of ten billion dollars per year.[80] To the extent that these plants are already built (or under construction today) and are entitled to cost recovery over a period of decades through customer rates, decreases in these investments will prove especially challenging and lead to new calls for regulator relief for incumbent power suppliers.[81]

Even more challenging, capital markets will need to shift investment resources towards lower-carbon sources of electric-power supply and more efficient customer energy use. The massive infrastructure transition to a low-carbon energy system will not happen overnight. Nor will the government provide the capital necessary to achieve it. Rather, it will require decades of new private financial commitments, supported by complementary regulatory commitments in public law. One decarbonization scenario relying on a balance of different energy resources anticipates annual electric power generation investments increasing by fifteen billion dollars per year from 2021–2030 and by over thirty billion dollars per year from 2031–2040.[82] By 2050, the electricity sector would need more than fifty billion dollars per year of capital investment in electricity generation.[83] A high-renewables case, with renewable energy making up the bulk of the power-supply portfolio, would require more than seventy billion

79. *See id.*

80. JAMES H. WILLIAMS ET AL., PATHWAYS TO DEEP DECARBONIZATION IN THE UNITED STATES 48 (2014), http://unsdsn.org/wp-content/uploads/2014/09/US-Deep-Decarbonization-Report.pdf.

81. This issue is addressed in Hammond & Rossi, *supra* note 62.

82. WILLIAMS ET AL., *supra* note 80, at 49.

83. *Id.*

dollars per year of new generation investments by 2050.[84] The total cost of getting there could be as a high six trillion dollars.[85]

Three impediments stand in the way of this transition: embedded tax incentives that favor incumbent energy resources, the lack of reasonably priced transmission access for non-incumbent power supply resources, and a failure to price the carbon attributes of energy.

As discussed above, in recent decades the federal government has failed to reassess how embedded federal tax incentives advantage legacy fossil fuel resources that are not available to developers of new energy sources.[86] Tax incentives may be important in promoting economic growth and investments in new technologies and, as is discussed below, many renewable energy resources have benefitted from these, albeit with considerable uncertainty.[87] Despite significant direct tax incentives for renewable power resources, the federal tax code still fails to provide sufficient incentives to overcome the legacy advantages of incumbent energy-supply resources, nor does it advance a level playing field for low-carbon energy supply. Many existing disparities in tax treatment give significant continuing-operation cost subsidies to legacy resources (primarily fossil fuel plants benefitting from decades of past tax advantages) and new plants burning natural gas also benefit from ongoing fuel-production tax subsidies and favorable partnership tax treatment, benefits that are unavailable to renewable power project developers.[88] Because of regulatory arbitrage,[89] utilities owning power-generation resources also continue to benefit from tax benefits and deductions (often further protected in customer rates) that are not available to nonutility suppliers of energy.[90]

A second public good problem is that, while federal regulators have embraced competitive markets in electric power supply, federal policies surrounding the expansion of electric-power transmission and its pricing remain weak. On the one hand,

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84. *Id.*
85. *See* Heal, *supra* note 18.
86. *See supra* Part II.A.
87. *See infra* Part III.B.1.
88. *See supra* Part II.A.
89. *See supra* note 46 and accompanying text.
90. *See* Rich Heidorn, Jr., *EEI Pledges To Fight Elimination of Tax Deductions*, RTO INSIDER (Feb. 9, 2017), https://www.rtoinsider.com/eei-investor-owned-utilities-38425 (noting that current tax deductions allow utilities opportunities to reduce their weighted cost of capital in comparison to other firms).

FERC's fixation on competitive power supply markets has invited firms and regulators to approach transmission pricing and investment decisions with a laissez faire attitude, ignoring it until a market or reliability crisis requires governmental intervention.[91] On the other hand, FERC's open-access policies are grounded on the principle that electric-power transmission operates much like a natural monopoly.[92] Recognizing how transmission is subject to monopoly abuses potentially subjects it to a regulatory treatment more in line with internal subsidies, including traditional cost-of-service ratemaking principles.

However, FERC continues to monitor whether the terms of access and pricing are just and reasonable, struggling mightily to give nondiscrimination any real meaning. A recent high-profile legal challenge before the D.C. Circuit to FERC's approval of a transmission arrangement that treats intermittent resources (such as wind) less favorably than nuclear power, hydro, and fossil fuel sources of power generation in energycapacity markets illustrates this struggle and its significance for low-carbon sources of energy.[93] Due in large part to regulatory ambivalence surrounding access and pricing of transmission, grid bottlenecks have grown and transmission lags in terms of new investment.[94] This kind of potential for discrimination in energy market access poses a particular threat to grid reliability, especially as the sources of energy supplying power to the grid become more numerous and diverse.[95] FERC possesses the authority to incentivize transmission-grid expansion to accommodate new sources of

91. *See* Hammond & Spence *supra* note 16, at 169–73 (discussing the move towards competitive power supply markets and the impacts of allowing the market to take control).

92. *See* Order No. 888, FERC Stats. & Regs., 75 FERC ¶ 31,036, 18 C.F.R. pts. 35 & 385 (1995), *aff'd*, New York v. FERC, 535 U.S. 1 (2002); *see also supra* note 72 and accompanying text.

93. *See* Suzanne Herel, *Clean Energy Advocates Appeal FERC's Capacity Performance Rulings*, RTO INSIDER (July 12, 2016), https://www.rtoinsider.com/enviros-ferc-pjm-capacity-performance-28701. The D.C. Circuit rejected the challenges to FERC's approval of a regional approach that required participants in capacity markets to commit to providing energy on an annual basis, which challengers alleged as discriminating against wind and solar resources. Advanced Energy Mgmt. All. v. FERC, 860 F.3d. 656 (D.C. Cir. 2017).

94. *See* Kennedy Maize, *FERC and Its Transmission Candy Jar*, ELECTRICITY POL'Y (2011), http://www.electricitypolicy.com/Maize-FERC%20Candy-6-6-11-final.pdf; Robert Walton, *As Operators Update Grid Planning for Renewables, Transmission Remains Key Constraint*, UTILITY DIVE (Sept. 18, 2017), http://www.utilitydive.com/news/as-operators-update-grid-planning-for-renewables-transmission-remains-key/505065.

95. *See* Maize, *supra* note 94.

power supply, including wind, but its regulatory initiatives to date fall short.[96] Exacerbating the problem further still, the approval of new transmission lines frequently faces state opposition, limiting the expansion of new transmission facilities to accommodate low-carbon energy sources such as wind and large-scale solar.[97]

A final public good challenge presented by competitive energy markets is the lack of any national policy to price the carbon attributes of energy resources in private transactions. With the exception of hydropower facilities and nuclear plants, under federal law states retain primary jurisdiction over decisions related to the siting and approval of new power-generation facilities.[98] Yet, most states make no serious effort to regulate carbon emissions at the existing sources of power generation. A few states, including most prominently California, have pursued ambitious efforts of their own to regulate carbon emissions from power-supply resources.[99] However, with competitive interstate power markets, initiatives such as California's cap-and-trade program may also produce negative spillover costs for neighboring jurisdictions.[100] This occurs when one state's stringent pollution-control policies cause the demand for dirty power resources to shift

96. *Id.*

97. *See, e.g.*, Ashley C. Brown & Jim Rossi, *Siting Transmission Lines in a Changed Milieu: Evolving Notions of the "Public Interest" in Balancing State and Regional Considerations*, 81 U. COLO. L. REV. 705, 744–48 (2010) (identifying how the connection between state siting decisions and ratemaking may discourage transmission grid expansion, given FERC's lack of siting authority); Alexandra Klass & Jim Rossi, *Revitalizing Dormant Commerce Clause Review for Interstate Coordination*, 100 MINN. L. REV. 129, 140–54 (2015) (noting how states present a holdout barrier to expansion of energy infrastructure, including transmission lines). *See generally* Jim Rossi, *The Trojan Horse of Transmission Line Siting Authority*, 39 ENVTL. L. 1015 (2009) (noting that the failure to expand the transmission grid is a function of the lack of FERC's authority to preempt states, but that the pricing of transmission also needs to be addressed).

98. *See* Lawrence R. Greenfield, Associate General Counsel, Fed. Energy Regulatory Comm'n, An Overview of the Federal Energy Regulatory Commission and Federal Regulation in Public Utilities in the United States 10, 12 (December 2010), https://www.ferc.gov/about/ferc-does/ferc101.pdf (providing what is and what is not within FERC's statutory authority); *see also* 16 U.S.C. § 824a (2012).

99. *See, e.g.*, Jim Rossi & Andrew J.D. Smith, *Electric Power "Resource Shuffling" and Subnational Carbon Regulation: Looking Upstream for a Solution*, 5 SAN DIEGO J. CLIMATE & ENERGY L. 43, 47–52 (2013–2014).

100. *See, e.g.*, *id.*

to neighboring states—a form of carbon leakage known as resource shuffling.[101] These kinds of problems can undermine state initiatives, absent some kind of border adjustment for energy imports and exports or a national effort to coordinate the carbon attributes of energy in market transactions. Furthermore, a recent Supreme Court decision has called into question whether internal subsidies adopted by states to promote goals such as grid reliability and carbon reduction can coexist at all with interstate energy markets—a topic discussed further below.[102]

D. THE SOLUTION OF A CARBON TAX

A national carbon tax provides a simple, straightforward solution to these problems. All proponents of such a tax see its core benefit as placing a value on important public goods, such as the carbon attributes of various energy resources. A carbon tax internalizes externalities associated with the production or consumption of energy that markets currently do not price. Pricing carbon in such a tax would better: (1) incentivize investments in energy-transportation infrastructure such as transmission; (2) promote more reasonable access and pricing for non-incumbent energy resources; and (3) enhance reliability as a more diverse range of low-carbon resources are integrated into the grid. Carbon proposals differ in their details, but most are premised on similar core principles that are relatively uncontroversial: resource neutrality in accounting for externalities, efficient cost spreading through broad-based application, ensuring fairness and equity in application, and avoiding domestic jurisdictional problems with a single national approach that would be priced into interstate energy transactions.

Neutrality is the first principle that informs carbon tax design.[103] For any tax to internalize the social cost of carbon, policymakers must approach energy resources neutrally in addressing their future carbon impacts and apply the same tax

101. For example, early implementation of California's cap-and-trade initiative has led utilities to shuffle their carbon emissions out of state, as utilities replace contracts to purchase energy from dirty power plants with cleaner resources, encouraging out-of-state utilities to then purchase the high-carbon energy for sales to customers. *See, e.g.*, *id.*

102. Hughes v. Talen Energy Mktg., LLC, 136 S. Ct. 1288, 1299 (2016). I return to discussion of this legal barrier to internal subsidies. *Infra* Part III.B.2.

103. *See* CASSADY ET AL., *supra* note 2, at 2; Metcalf & Weisbach, *supra* note 6, at 514–15.

treatment to both incumbents and new-entrant energy resources. By providing an opportunity to revisit the tax treatment of energy resources, it would address much of the lack of parity in current tax treatment of energy-production resources. Neutrality in tax treatment could also help overcome the carbon lock-in created by legacy fossil fuel energy resources.

A second principle is cost spreading. A carbon tax places a value on important public goods such as the carbon attributes of various energy resources that markets currently do not price. This can be achieved through an excise tax (borne directly by customers) or a production tax (coupled with international border adjustments[104]). Each approach raises its own set of administrative, efficiency, and fairness concerns, but whoever is assessed an immediate tax, a significant portion of the costs of carbon reduction will ultimately be passed on to everyone who consumes energy—helping to spread the burden of any carbon-reduction initiative.

A third principle informing carbon tax design is the need for attention to equity and fairness. Discussions of a carbon tax cannot avoid the fundamental question of discrimination between consumers of energy, as well as discrimination among suppliers. While policymakers may disagree about the details, notions of fairness and distribution justice inform design of a carbon tax—along similar lines to the design of any tax-based approach to providing for public goods.

A final principle that informs carbon tax design is jurisdictional evenhandedness. A carbon tax addresses spillovers that are presented by a state-by-state approach to regulating carbon emissions, such as carbon-leakage problems. In addition, a carbon tax provides an elegant and simple way to account for the social costs of carbon in an interstate energy market, sidestepping many current jurisdictional disagreements between federal and state regulations and minimizing any new energy-market distortions. At the same time, any domestic carbon tax requires some form of border adjustment to address carbon-leakage issues related to international trade.[105]

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104. For a discussion of border tax adjustments for excise tax, see Metcalf & Weisbach *supra* note 6, at 542–45.

105. *See id.*

III. EXISTING INTERNAL SUBSIDIES FOR CARBON REDUCTION

Even absent a carbon tax, energy regulators do not need to give up on the public good goal of carbon reduction or the principles it brings to bear on energy policy. Going forward, policymakers need to strike a balance, being attentive to declining investments in fossil fuels as older generation resources are reassessed and (in many instances) replaced,[106] yet simultaneously growing infrastructure investments to accommodate low-carbon resources and electrification of transportation.

The carbon lock-in associated with existing energy infrastructure underscores the significant role that both tax and regulatory tools can have in shaping electric power-supply infrastructure. Energy regulators already have many tools at their disposal to overcome carbon lock-in and promote carbon reduction in the energy sector.[107] This Part surveys how many of these tools are already being leveraged by regulators to pursue the policy goal of carbon reduction through internal subsidies. Much like a carbon tax, internal subsidies can steer private firms and individuals towards investing in low-carbon energy-infrastructure investments.

However, since these tools are more fragmented and decentralized in their application, they fail to fully recognize the social cost of carbon for all energy resources. They also can introduce market distortions, given that energy today is no longer produced and consumed within the borders of each individual state but instead is traded in competitive interstate markets.[108] Various approaches to internal subsidies present inevitable policy tradeoffs and also fall considerably short of the efficiency and social-welfare benefits that a carbon tax could provide. Their current use presents regulators an opportunity to advance efficiency and social welfare by coordinating these initiatives, both across energy resources and across jurisdictions, to ensure that best features of regulation do not bring out the worst incentives for energy suppliers.

The principles for optimal design of a national carbon tax provide a benchmark against which we can gauge the efficacy of

106. For example, it is important that regulators carefully monitor the growth of bridge fuels, such as natural gas, to ensure they do not become a stranded cost on any regulatory transition. *See* Hammond & Rossi, *supra* note 62, at 648–49.

107. *See, e.g.*, Rossi & Hutton, *supra* note 28, at 1295–1303.

108. *See* Hammond & Spence, *supra* note 16, at 151–53.

internal subsidies in promoting efficiency and public welfare, and in assessing the reforms to internal subsidies. Measured against this benchmark, there is considerable opportunity for internal subsidies to be expanded and reformed. A more concerted effort must be made to determine the most efficient way of assessing the customer burden of low-carbon energy, to address basic fairness and equity issues related to the pricing of energy, and regulators also need to be attentive to and proactive in addressing various jurisdictional spillovers.[109] Based on the examples below, in Part IV I identify some principles to help regulators in approaching internal subsidies in the transition to a low-carbon energy system.[110]

A. THE SUBSIDY IMPLICATIONS OF LOW-CARBON ENERGY MANDATES

Regulatory mandates exist in many places in energy law. Yet scant attention is given to how a mandate also can promote and reinforce internal subsidies in the pricing of energy resources. As this Section argues, these mandates can serve to justify and reinforce subsidies in customer rates.

A regulatory mandate seeks to achieve a specific outcome or goal, subjecting noncompliance to a consequence. Often this takes the form of a penalty designed to deter harmful conduct or to disgorge benefits from a wrongdoer. Without regulation of prices, as in a competitive market (such as bulk power generation today), a firm paying this penalty gets to choose whether to pass this on to customer or take the loss from its own profits (and thus pass it on to investors). In a competitive market most firms would choose to have customers bear these costs, unless the noncompliance penalty they face is firm-specific and is not something that competing firms are also forced to bear. But to the extent that a mandate requires a firm to make new investment choices that it would not otherwise select, these mandates must

109. Similar problems are identified in Metcalf & Weisbach, *supra* note 6, at 541–51. These authors come at a carbon tax through the lens of efficient institutional design, based on the principles of sound tax policy. *See generally* Metcalf & Weisbach, *supra* note 6. While they highlight how these problems need to be addressed in the designing of carbon tax, they make no effort to address how these problems are also rampant in the present approach to energy regulation, including in many internal subsidies designed to promote low-carbon energy resources. *See infra* Part IV.B.

110. *See infra* Part IV.B.

be subsidized by someone, though the firm in a competitive market chooses itself whether to allocate the cost among investors or customers.

Where mandates apply to a regulated firm (such as an electric-power distribution utility), taxation by regulation (that is, by internal subsidy) presents at least one advantage over a carbon tax: specifically, it gives regulators an opportunity to better align a mandate's goals with its burdens by targeting the specific conduct that produces harm. An internal subsidy does not leave the choice of who pays for a mandate to the firm, allowing regulators to impose the costs of penalties on those who are most likely to respond to them, more precisely managing the level of harm-producing activities. By contrast, where a mandate is not addressing a harm produced by a single firm, but instead is promoting the creation of some public good in the future, an internal subsidy allows regulators a mechanism for passing it through in customer rates, much like an excise tax.[111] A firm with regulated rates facing a mandate designed to encourage new technological investments will typically subsidize compliance costs through internal subsidies in rates—which will also present regulators (not the firm) the opportunity to decide how to allocate this internal subsidy among customers and to revisit these decisions over time. In approaching new mandates, regulators often need to be attentive to how this mandate is paid for: will it automatically be passed on to customers, how broadly, and who will bear the burden of it?[112]

Although the federal government's regulation of the carbon emissions from existing plants has been recently repealed,[113] current federal and state policies rely on a broad range of regulatory mandates to advance the public good of carbon-reduction. For example, existing Clean Air Act emissions requirements pro-

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111. To the extent that a carbon tax envisions that pollution control and other low-carbon energy mandates will continue to exist, it makes no effort to coordinate how these are paid for and by whom. Taxation by regulation, by contrast, gives regulators the opportunity to allocate the costs.

112. For a discussion of compliance costs and penalties, see J. HEETER ET AL., NAT'L RENEWABLE ENERGY LAB., A SURVEY OF STATE-LEVEL COST AND BENEFIT ESTIMATES OF RENEWABLE PORTFOLIO STANDARDS, at v (May 2014), https://www.nrel.gov/docs/fy14osti/61042.pdf.

113. *See* Juliet Eilperin & Brady Dennis, *EPA Chief Scott Pruitt Tells Coal Miners He Will Repeal Power Plant Rule Tuesday: "The War Against Coal Is Over,"* WASH. POST (Oct. 9, 2017), https://www.washingtonpost.com/news/energy-environment/wp/2017/10/09/pruitt-tells-coal-miners-he-will-repeal-power-plan-rule-tuesday-the-war-on-coal-is-over.

duce carbon reductions, either through direct regulation of emissions for new power plants or through the regulation of co-pollutants such as mercury.[114] Apart from emissions mandates, common examples of mandates aimed at electricity production include state RPS standards, zero-emissions vehicle (ZEV) mandates that promote electrification of transportation, and energy efficiency mandates aimed at reducing electricity consumption. Unfortunately, in adopting these mandates, regulators have largely ignored their internal subsidy implications, paying little or no attention to whether they will be paid for by customers and whether the burden in rates will be shared broadly. As these mandates are scaled up to approach one hundred percent renewable energy, cost-allocation issues will also need to be addressed.

1. State RPS Mandates

An RPS is a regulatory mandate to increase production of energy from renewable sources, such as wind, solar, biomass and other alternatives to fossil fuel and nuclear generation.[115] As of March 2015, twenty-nine states and Washington, D.C. have adopted mandatory RPS requirements.[116] These standards consistently allow compliance by establishing that a percentage of energy sold comes from wind and solar.[117] States differ somewhat in the definition of which additional technologies meet an RPS, and many states have designed these standards to promote specific technologies or resources by including carve-out provisions that mandate a certain percentage of electricity generated come from a specific source, such as solar or biomass.[118] If a utility is unable to directly produce or purchase renewable energy to comply with an RPS, most states allow utilities to purchase renewable energy credits to comply with the standard.[119]

State RPS mandates have proved to be effective mandates for encouraging development of renewable energy, in large part

114. *See* 42 U.S.C. § 7402(g) (2012).

115. *See* HEETER ET AL., *supra* note 112, at 1–2.

116. EPA, ENERGY AND ENVIRONMENT GUIDE TO ACTION 5-1 (2015), https://www.epa.gov/sites/production/files/2015-08/documents/guide_action_full.pdf. An additional eight states have adopted non-binding RPS goals. *Id.*; *see also* *Summary Tables*, DSIRE, http://programs.dsireusa.org/system/program/tables (last visited Oct. 18, 2017) (providing additional data on state RPS standards).

117. EPA, *supra* note 116.

118. *See generally* HEETER ET AL., *supra* note 112, at 79–97 (discussing various state carve-out provisions).

119. *See id.*

because they allow utilities flexibility in how they choose to comply with renewable power targets.[120] They have worked to encourage renewable energy across different state regulatory environments, including traditional cost or service regulation, as well as states that have moved towards competitive retail energy markets.[121] The RPS targets provide stability for renewable-project investors, and typically ramp up steadily over time to encourage greater investment in renewable projects.[122] States, such as Texas and Iowa, have been leaders in promoting wind energy have RPS requirements, and it is estimated that state RPS policies have driven sixty to eighty percent of all U.S. solar photovoltaic installations.[123]

State RPSs are often criticized as imposing a cost for electricity customers. In terms of average energy prices, however, RPS requirements have only a minimal impact on customer rates—perhaps because utilities subject to RPS requirements typically allocate compliance costs among all of the customers within the requirement's jurisdiction.[124] RPS requirements also produce significant benefits in many states, by reducing the costs of production for new renewable-power projects.[125] Another criticism is that state-by-state RPS approaches are not always consistent in their standards and enforcement, which can create an unpredictable situation for investors in power resources that are aiming to trade energy in interstate commerce and result in carbon leakage.[126] Although, as discussed below in Part IV, some federal renewable energy goals have been proposed in legislation, to date the federal government has failed to adopt any national renewable energy requirement.[127] Problems remain, however, because states have limited ability to spread the costs of RPSs among out-of-state customers who benefit from them and

120. EPA, *supra* note 116, at 5-11.

121. *See id.* at 5-15.

122. *See id.* at 5-19.

123. *Id.* at 5-1 to -2.

124. Compliance costs are estimated to constitute less than two percent of average retail rates in most states with RPS mandates. *See* J. HEETER ET AL., *supra* note 112, at v.

125. *See, e.g.*, Lincoln L. Davies, *Power Forward: The Argument for a National RPS*, 42 CONN. L. REV. 1339, 1359–60 (2010); Joshua P. Fershee, *Moving* Power Forward: *Creating a Forward-Looking Energy Policy Based on a National RPS*, 42 CONN. L. REV. 1405, 1413–14 (2010).

126. *See, e.g.*, Davies, *supra* note 125, at 1368–70 (arguing in favor of a national RPS); Fershee, *supra* note 125, at 1414 (arguing the same).

127. *See infra* Part IV.D.

there is potential for carbon leakage across jurisdictions, given interstate markets in electric power.

2. Energy Efficiency Mandates

The federal government has adopted a variety of industry mandates related to lighting and appliance standards, such as HVAC efficiency requirements. Additionally, many states have adopted building codes for new construction aimed at reducing electricity consumption. While economists tend to prefer cost internalization that reinforces price signals (such as a carbon tax) over mandates,[128] there is little doubt that these requirements have played a significant role in steering consumer and investment decisions towards less-energy-intensive technologies. For example, mandates have reduced the demand for electricity by requiring adoption of specific lighting or appliance technologies, or requiring investment in energy-efficient buildings.

As many as twenty-three states set broader state energy efficiency resource standards (EERSs), mandating that utilities meet specific efficiency targets.[129] For example, Michigan's 2008 Clean, Renewable and Efficiency Energy Act[130] specifies efficiency targets (namely, a one percent annual reduction in power sales) and requires utilities to meet them.[131] The Arizona, Maine, Massachusetts, Rhode Island, and Vermont EERSs require an almost 2.5% annual savings.[132] California has made specific efforts to tie energy-efficiency improvements to carbon and other GHG emissions in recent legislation[133] that targets a

128. Ted Gayer & Alexander K. Gold, *Four Reasons To Be Wary of Energy-Efficiency Mandates*, BROOKINGS (May 1, 2015), https://www.brookings.edu/blog/planetpolicy/2015/05/01/four-reasons-to-be-wary-of-energy-efficiency-mandates.

129. D. STEINBERG & O. ZINAMAN, NAT'L RENEWABLE ENERGY LAB., STATE ENERGY EFFICIENCY RESOURCE STANDARDS: DESIGN, STATUS, & IMPACTS 3 (2014), https://www.nrel.gov/docs/fy14osti/61023.pdf.

130. S.B. 213, 94th Leg., Reg. Sess. (Mich. 2008) (current version at MICH. COMP. LAWS § 460.1001 (2017)).

131. David Eggert, *Energy Efficiency in Michigan: What You Need To Know*, LANSING ST. J. (Nov. 23, 2015), http://www.lansingstatejournal.com/story/news/local/2015/11/23/energy-efficiency-michigan-need-know/76170664.

132. AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., STATE ENERGY EFFICIENCY RESOURCE STANDARDS (EERS) 2–6 (2017), http://aceee.org/sites/default/files/state-eers-0117.pdf (listing the details for each state's energy efficiency standard).

133. S.B. 350, 2015–2016 Reg. Sess. (Cal. 2015) (current version at CAL. PUB. UTIL. CODE § 399.11 (West 2016)).

thirty percent reduction in electricity needs by 2030.[134] These EERSs are expected to yield an average reduction in electricity consumption of as much as ten percent by 2020.[135]

Much like RPSs, EERS requirements leave utilities flexibility in how they meet targets and allow customers to share in the responsibility for efficiency improvements.[136] However, also like RPS requirements, states differ in their definitions of what counts as efficiency, with some focused on reducing total energy consumption or energy sales and others focused on reducing peak energy.[137] To better match the goals of deep decarbonization, energy-efficiency requirements need to recognize how shifts in energy use associated with vehicle electrification will necessitate some growth in the demand for electric power. These efficiency requirements must thus look at the energy system as a whole (not just electric power) and must also focus on how reducing peak demand can produce decarbonization benefits (even if total consumption increases).[138]

An additional form of state mandate regarding energy efficiency is "decoupling," requirements directed at retail utilities subject to cost-of-service ratemaking.[139] Under the traditional approach to ratemaking, a utility's revenues increase along with customer energy use: the more energy customers use, the more revenue a utility collects and the better its financial performance.[140] Several states require utilities to decouple their revenue requirements from customer energy use in cost-of-service ratemaking, focusing on some policy objective over increased

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134. Merrian Borgeson, *California Legislature Doubles Down on Energy Efficiency*, NAT. RESOURCE DEF. COUNCIL: EXPERT BLOG (Sept. 11, 2015), https://www.nrdc.org/experts/merrian-borgeson/california-legislature-doubles-down-energy-efficiency.

135. STEINBERG & ZINAMAN, *supra* note 129, at 25.

136. *See id.* at 15.

137. *See* KAREN PALMER ET AL., RES. FOR THE FUTURE, PUTTING A FLOOR ON ENERGY SAVINGS: COMPARING STATE ENERGY EFFICIENCY RESOURCE STANDARDS 4 (2012), http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-DP-12-11.pdf.

138. *See generally* Daniel L. Summerbell et al., *Cost and Carbon Reductions from Industrial Demand-Side Management: Study of Potential Savings at a Cement Plant*, 197 APPLIED ENERGY 100 (2017) (discussing how a cement plant's shift of energy use to non-peak periods reduced carbon emissions).

139. *See Utility Rate Decoupling*, ALL. TO SAVE ENERGY (Oct. 24, 2013), https://www.ase.org/resources/utility-rate-decoupling-0.

140. *Id.*

sales of energy to customers.[141] A rate design that decouples revenues from sales encourages utilities to give customers price signals to discourage energy use, such as time-of-day pricing or increasing energy rates for greater consumption, or refunds for using less energy.[142] An advantage of these approaches is that they directly encourage a reduction in the peak demand for energy, reducing need for new power supply capacity additions.[143] Decoupling approaches vary substantially among states; several state regulators have mandated decoupling,[144] but most states (along with the federal government) continue to encourage it on a voluntary basis, or simply allow utilities to use it as one way of meeting an EERS requirement.[145]

3. ZEV Mandates

Federal emissions mandates encourage automobile manufacturers to adopt low-emission technologies for fleets of vehicles, including the development of electric vehicles.[146] Federal law does not mandate ZEVs, and allows manufacturers flexibil-

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141. *See* CTR. FOR CLIMATE & ENERGY SOLS., REVENUE DECOUPLING—AN OVERVIEW 2, https://www.c2es.org/docUploads/revenue-decoupling-detail.pdf.

142. *See generally* BRENDON BAATZ, AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., RATE DESIGN MATTERS: THE INTERSECTION OF RESIDENTIAL RATE DESIGN AND ENERGY EFFICIENCY (2017), http://www.ourenergypolicy.org/wp-content/uploads/2017/03/u1703.pdf (comparing different rate designs' abilities to influence consumer behavior).

143. *See id.* at 8–10 (describing different rate designs' effects on peak energy consumption).

144. *See* CTR. FOR CLIMATE & ENERGY SOLS., *supra* note 141, at 4 (noting that California, Massachusetts, and Connecticut all require utilities to have some form of decoupling program in their next rate case, while several other states have approved voluntary decoupling programs).

145. *See Utility Rate Decoupling*, *supra* note 139. The American Recovery and Reinvestment Act of 2009 conditioned receipt of more than three billion dollars in Energy Efficiency Program funds on the states' creation of policies to align utility incentives with efficiency goals. Pub. L. No. 111-5, 123 Stat. 115 (codified in relevant part at 26 U.S.C. § 54D (2012)).

146. Both EPA and the National Highway Traffic Safety Association (NHTSA) have adopted credit multipliers that allow manufacturers to carry greenhouse gas credits forward by up to five years. Averaging, Banking, and Trading (ABT) Credit Program, 49 C.F.R. § 535.7 (2017). While the Clean Air Act authorizes EPA to adopt credit multipliers to encourage new technologies such as vehicle electrification based on tailpipe emissions, 42 U.S.C. § 7404 (2012), to date it appears that NHTSA does not believe that it has such authority given the CAFE program's focus on fuel use. *Corporate Average Fuel Economy*, NHTSA (Aug. 24, 2017), https://www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy. Consequently, NHTSA's credits are limited to alternative fuel vehicles and do not include electric vehicles. *Id.*

ity to adopt different technological approaches for transportation.[147] But section 209 of the Clean Air Act gives California unique authority to issue stricter vehicle-emissions requirements than the federal standard, and also allows other states to adopt the more stringent standard based on California's requirements.[148] California's ZEV program requires automobile companies to produce a certain percentage of zero-emissions vehicles for sale in California, such as hydrogen fuel cell, battery electric, and hybrid vehicles.[149] Under this standard, by the 2025 model year automakers that sell vehicles in California must meet a sixteen percent ZEV requirement.[150] Nine other states have announced that they will follow California's lead and adopt ZEV standards of their own.[151] These ZEV mandates could prove important to facilitating electrification of the vehicle fleet. At the same time, they could have unintended consequences.[152] Specifically, they do not address how additional electric power supply will be provided, including whether it will come from fossil fuel or low-carbon sources of energy.[153] Nor do they address the important internal subsidy issue of who will pay for it.[154]

B. SUBSIDIES FOR LOW-CARBON ENERGY RESOURCES

In contrast to mandates, electric-power subsidies reflect direct or indirect transfers to private firms to promote particular forms of investment in low-carbon energy resources.[155] Much like longstanding federal programs that benefit legacy fossil fuel

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147. *See generally Key Federal Legislation*, U.S. DEP'T OF ENERGY: ALT. FUELS DATA CTR., https://afdc.energy.gov/laws/key_legislation (last visited Oct. 18, 2017) (summarizing federal laws related to alternative fuels, air quality, fuel efficiency, and other transportation issues).

148. 42 U.S.C. § 7543 (2012).

149. *See generally* CAL. CODE REGS. tit. 13, § 1962.2 (2015) (describing standards for 2018 and beyond).

150. *See ZEV Programs*, CTR. FOR CLIMATE & ENERGY SOLS. (last updated 2013), http://www.c2es.org/us-states-regions/policy-maps/zev-program.

151. *Id.*

152. *See* JULIAN MORRIS & ARTHUR R. WARDLE, REASON FOUND., CAFE AND ZEV STANDARDS: ENVIRONMENTAL EFFECTS AND ALTERNATIVES 8–9 (2017), http://www.reason.org/files/cafe_zev_standards_environment_alternatives.pdf.

153. *Id.*

154. *See id.*

155. *See generally* Roberts, *supra* note 36 (providing a general summary of federal programs).

resources,[156] these subsidies often take the form of taxation rather than regulation.[157] Such subsidies often draw on the nation's general tax base, as with income tax credits, to encourage investment in particular clean-energy technologies such as wind power.[158]

In line with Posner's notion of taxation by regulation, both federal and state regulators increasingly also rely on internal subsidies to promote low-carbon energy resources. Internal subsides are typically built into regulated customer rates, which pass through the costs of carbon reduction to consumers outside of the public tax system. Though below-the-radar in comparison to tax incentives, internal subsidies are deeply embedded in energy regulation and have played an important role in helping to encourage the adoption of new energy capital projects with high front-end fixed costs, such as investments in nuclear power. With increased attention to clean energy in the past decade, they have spread and grown in significance in the setting of customer rates—though they also leave many important efficiency and social-welfare issues unaddressed.

1. Low-Carbon Subsidies Through General Taxation

Similar to longstanding tax subsidies that favor legacy fossil fuel energy resources, many existing tax subsidies also aim to encourage investment in low-carbon energy projects.[159] Perhaps the most substantial existing tax subsidies are federal tax credits for solar and wind projects.[160] The thirty percent investment tax credit used for many solar projects and some wind projects was adopted in 2006 and, following a 2016 extension, is presently set to expire in 2022.[161] The production tax credit for wind projects was adopted in 1992 and has been subject to expiration every few years, creating great uncertainty among wind investors (and leading to significant declines in investments in new

156. *See supra* Part II.A.

157. *See* Roberts, *supra* note 36, at 73–74.

158. *See Total Energy Subsidies Decline*, *supra* note 38.

159. *See, e.g.*, HARRISON FELL ET AL., RES. FOR THE FUTURE, DESIGNING RENEWABLE ELECTRICITY POLICIES TO REDUCE EMISSIONS 8–9 (2012), http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-DP-12-54.pdf (describing how the Renewable Energy Production Tax Credit influenced wind energy development).

160. TRIEU MAI ET AL., NAT'L RENEWABLE ENERGY LAB., IMPACTS OF FEDERAL TAX CREDIT EXTENSIONS ON RENEWABLE DEPLOYMENT AND POWER SECTOR EMISSIONS 1 (2016), https://www.nrel.gov/docs/fy16osti/65571.pdf.

161. *See id.* at 1–2.

projects).[162] As of 2015, it has been renewed until 2020—though in 2017 the credits will be declining in value by twenty percent per year.[163] These tax credits are available nationwide and financed through the general tax base.[164] They have significantly impacted wind and solar project development.[165] But they also have been criticized for promoting energy consumption and failing to provide incentives for new projects based on the environmental qualities of new power projects, which vary geographically in price and the degree to which they displace fossil fuel energy resources.[166]

State and local governments also offer tax incentives for renewable energy projects, paid for by citizens in their taxes.[167] Property Assessed Clean Energy (PACE) programs provide a good example.[168] These programs allow property owners to voluntarily opt to participate in a government program, qualifying for a loan to cover the large up-front costs associated with energy efficiency improvements or solar panels and repay these costs over a ten-to-twenty-year period through property assessments.[169] The costs can sometimes be covered through property taxes, but many local governments finance these programs through special assessment districts that issue bonds to cover the costs.[170] While such programs could be very promising, federal restrictions on home loans have hobbled state and local governments' ability to expand residential PACE incentives.[171]

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162. *See id.* at 1.

163. *Id.* at 2.

164. *See, e.g.*, FELL ET AL., *supra* note 159, at 4 (depicting different renewable energy production levels for renewable energy programs across various regions of the United States).

165. MAI ET AL., *supra* note 160, at 1.

166. *See* FELL ET AL., *supra* note 159, at 2.

167. *See, e.g.*, DEP'T OF ENERGY, BEST PRACTICE GUIDELINES FOR RESIDENTIAL PACE FINANCING PROGRAMS (2016), https://www.energy.gov/sites/prod/files/2016/11/f34/best-practice-guidelines-RPACE.pdf (detailing one such program).

168. *See id.* at 1.

169. *See id.* At 4–5; *see also What Is PACE?*, PACE NATION, http://www.pacenation.us/what-is-pace (last visited Oct. 18, 2017) (providing basic information on PACE programs, such as general length of repayment).

170. *See* Office of Energy Efficiency & Renewable Energy, *Property Assessed Clean Energy Programs*, U.S. DEP'T OF ENERGY, https://energy.gov/eere/slsc/property-assessed-clean-energy-programs.

171. *See id.* (noting how recent Federal Housing Financing Agency guidelines have led to suspension of many PACE programs for residential property owners).

2. Ratepayer Subsidies for Low-Carbon Power Projects

Over the history of the electric power industry, internal subsidies paid by ratepayers have proved essential to financing important infrastructure projects with high front-end fixed costs, such as the tens of thousands of miles of new transmission lines built for rural customers in the years following the New Deal.[172] While customer subsidies can lead to controversial and inefficient investment choices, as with investments in nuclear power during the 1960s and 1970s,[173] they also provide utilities a way of using customer rates to help reduce financing costs and uncertainty for expensive new infrastructure projects, without resorting to governmental taxation.

Capital-intensive infrastructure projects, including most low-carbon sources of power supply, similarly face high front-end fixed costs. It is difficult for private markets to raise sufficient capital to finance these projects, especially where there is financial, technological and regulatory uncertainty.[174] In approaching decarbonization of the grid, ratepayer subsidies can serve as a form of taxation to help finance new sources of power supply and transmission infrastructure. However, unless approached carefully, existing approaches to these subsidies also might hinder efficient and fair efforts to promote low-carbon infrastructure investments.[175] Two significant problems that these subsidies present are technology lock-in and jurisdictional spillovers.

a. *Technology Lock-In Problems*

In the context of nuclear power plants, state regulators have responded to concerns with high fixed costs by allowing utilities to receive accelerated cost recovery from customers for investments in new projects.[176] Especially as new technologies such as modular nuclear become commercially viable, these types of fi-

172. *See* Linda A. Cameron, *Power to the Farmer: Minnesota and the Rural Electrification Act*, MINNPOST (Feb. 27, 2017), https://www.minnpost.com/mnopedia/2017/02/power-farmer-minnesota-and-rural-electrification-administration.

173. *See* Pierce, *supra* note 53, at 504–05.

174. *See, e.g.*, *id.* at 505 (describing problems caused by investment in nuclear plants despite numerous uncertainties).

175. *See, e.g.*, Roberts, *supra* note 36, at 112–13 (noting how the current Production Tax Credit program has raised issues in wind energy development).

176. *See* Pierce, *supra* note 53, at 508–09.

nancing mechanisms could prove important to private investment decisions.[177] Such financing mechanisms could also prove essential to other costly clean-energy infrastructure decisions, such as carbon capture and sequestration (CCS), new multistate transmission lines for renewable power supply, and utility-scale solar facilities.[178] Regulators are often allowed to spread the costs of new projects broadly among customers, usually through fixed rate charges (also known as demand charges).[179] Significantly, such strategies are subject to customer backlash and not always successful. For example, Mississippi's Supreme Court rejected front-end retail customer cost recovery to support Southern Company's significant capital investment in a CCS facility (through its subsidiary Mississippi Power), leaving cost recovery to ordinary prudence review of customer rates and creating substantial uncertainty surrounding the investment climate for this important new technology.[180]

Another widely used approach to addressing earlier-generation environmental compliance is a rate adder, or a surcharge fee on customer rates, that is allocated to pay for the costs of complying with state or federal environmental standards.[181] These have been used for decades in many states.[182] Most adders target particular pollution-abatement technologies that are nec-

177. *See, e.g.*, Mark Cooper, *Small Modular Reactors and the Future of Nuclear Power in the United States*, 3 ENERGY RES. & SOC. SCI. 161, 172–73 (2014) (describing how the high cost of new nuclear technology can make implementation unfeasible).

178. *See, e.g.*, *The United States CCS Financing Overview*, MIT, http://sequestration.mit.edu/tools/projects/us_ccs_background.html (last updated Sept. 30, 2016) (noting the massive start-up costs for different CCS projects).

179. *See* Pierce, *supra* note 53, at 514.

180. *See* Darren Samuelsohn, *Billions over Budget. Two Years After Deadline. What's Gone Wrong for the "Clean Coal" Project That's Supposed To Save an Industry?*, POLITICO (May 26, 2015), http://www.politico.com/agenda/story/2015/05/billion-dollar-kemper-clean-coal-energy-project-000015 (noting how the original price tag of the Kemper CCS project swelled from $1.8 to $6.2 billion); Ian Urbina, *Piles of Dirty Secrets Behind a Model "Clean Coal" Project*, N.Y. TIMES (July 5, 2016), http://www.nytimes.com/2016/07/05/science/kemper-coal-mississippi.html (describing cost overruns and other problems with the Kemper project).

181. Catherine M.H. Keske et al., *Total Cost Electricity Pricing: A Market Solution for Increasingly Rigorous Environmental Standards*, 25 ELECTRICITY J. 7, 8–9 (2012).

182. *Id.* (noting that by the mid-1990s more than half the states had adopted or were considering environmental adders).

essary to comply with environmental mandates—basically compensating the firm for compliance with a particular standard.[183] They have been criticized, however, insofar as they invite energy regulators to add new environmental requirements that may be at odds with environmental standards.[184]

These kinds of ratepayer subsidies for new power projects often require regulators to pick winners and losers, locking in decades of financial commitments for specific projects and technologies.[185] Over time, however, technologies evolve and project cost estimates can significantly increase, creating a significant revenue shortfall not automatically corrected through adoption of a new budget.[186] An environmental adder that compensates a firm for meeting a particular pollution control standard, for example, can lock-in an abatement technology for decades, even though technology and regulatory standards continue to improve and decline in cost.[187] This reduces the effectiveness of environmental regulators showing any flexibility in compliance approaches, as flexibility may allow firms a revenue windfall.[188] For this reason, many economists have disfavored state regulator use of environmental adders, instead favoring a mandate approach for pollution control that allows the firm to pass on prudent compliance costs and to determine the optimal compliance strategy.[189]

The technology lock-in problem with customer rate subsidies is also illustrated by the now-notorious nuclear plant costs overruns of the 1970s and 1980s.[190] As new, lower-cost power generation technological opportunities became more cost feasible, utilities aggressively sought ratepayer recover for stranded costs from plants that were not benefitting customers.[191] This only reinforces perceptions that firms are owed something due

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183. *See id.* at 11 (stating that utilities would rank different technologies to achieve the most competitive price, influenced by each technology's added social cost).

184. Paul Joskow, *Weighing Environmental Externalities: Let's Do It Right!*, 5 ELECTRICITY J. 53, 57–58 (1992).

185. *E.g.*, Roberts, *supra* note 36, at 107.

186. *See* Samuelsohn, *supra* note 180; Urbina, *supra* note 180.

187. Joskow, *supra* note 184, at 66–67.

188. *See id.*

189. *See id.*; *see also* Stephen R. Connors, *Externality Adders and Cost-Effective Emissions Reductions: Using Tradeoff Analysis To Promote Environmental Improvement and Risk Mitigation*, 55 ECON., EFFICIENCY, & QUALITY: PROC. AM. POWER CONF. 1 (1993).

190. *See* Pierce, *supra* note 53, at 504–05.

191. *Id.*

to a regulator's previous decisions, leading to regulatory bailouts that can be particularly burdensome for customers with no substitutes.[192]

Similar challenges plague customer subsidies designed to pay for some high-cost low-carbon projects, such as Mississippi Power's Kemper CCS facility.[193] Mississippi regulators approved this project for cost recovery, allowing Mississippi Power to collect revenues in customer rates and build up significant accounts for the Kemper CCS project.[194] However, the Kemper CCS project was delayed and never became operational—ultimately resulting in rate refunds.[195] While such rate refunds protect current customers, they do little to move infrastructure forward—essentially starting the regulatory and rate-approval clock all over again on any additional carbon reduction proposals.

Rather than treating these early cost recovery decisions as project-specific revenue streams for particular utilities, each needing its own approval and rate treatment, regulators might be able to adopt project funding tools that allow them to take advantage of the passage of time: for example, subjecting project approvals to ongoing prudence review that incorporates new information as more is learned about different technologies and project construction costs. In other words, based on an initial determination of need for low-carbon infrastructure, regulators might approve the collection from customers of up-front costs for new projects, holding them in trust (as a form of insurance) in carbon infrastructure accounts; if for some reason a specific project is later deemed imprudent by regulators (for example due to cost overruns or new technological developments), rather than ordering a rate refund (as occurred in the case of the Kemper CCS project[196]) these collected funds could be reallocated to other large-scale low-carbon infrastructure projects, which could be selected through some kind of competitive bidding process. Similarly, rather than representing payments to specific firms, carbon adders could be designed to fund new low-carbon infrastructure projects.

192. *See* Hammond & Rossi, *supra* note 62, at 680.
193. *See* Samuelsohn, *supra* note 180; Urbina, *supra* note 180.
194. *See* Samuelsohn, *supra* note 180; Urbina, *supra* note 180.
195. Samuelsohn, *supra* note 180; Urbina, *supra* note 180.
196. Samuelsohn, *supra* note 180; Urbina, *supra* note 180.

b. Jurisdictional Spillover Concerns

Another problem with existing customer subsidy approaches relates to jurisdictional spillovers. One state's customers may be paying for these adders while energy produced in that state may be traded in interstate markets, which can produce distortions in the supply and demand for power.[197]

This problem is not without regulatory solution. The most obvious way to fix it would be to scale-up subsidies to a national level—a problem that a national carbon tax could readily solve. Even absent a national carbon tax, states adopting carbon adders could make adjustments to customer rates for energy imported from power generators in other states, akin to the kinds of border adjustments used in taxation.[198] Alternatively, a form of carbon adder could be adopted at the regional level, for example, as a carbon adder for different sources of energy to the prices in RTO open-access transmission tariffs approved by FERC.[199] Such an approach could be used to produce a carbon infrastructure fund, distributing resources to new projects approved by states within the RTO's footprint.[200]

However, these kinds of approaches risk running into some legal obstacles under federal law. FERC's "just and reasonable" rate requirement under the Federal Power Act (FPA)[201] requires the agency to make an effort to find some shared benefits or quantify the project's benefits, such as a multistate transmission to serve renewable sources of electric power, prior to regulatory approval of subsidies that spread the project's costs among customers.[202]

In a 2009 decision written by Judge Posner, the U.S. Court of Appeals for the Seventh Circuit held that FERC is subject to a cost causation principle, which requires the agency to make some effort to quantify the benefits from allocating the costs of new transmission to wholesale customers before imposing those costs.[203] In rejecting FERC's approval of pro rata cost allocation

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197. *See, e.g.*, Joskow, *supra* note 184, at 59–60.

198. *See* Metcalf & Weisbach, *supra* note 6, at 541.

199. *See* Judy Chang, Brattle Group, Presentation to Harvard Law School Environmental Policy Initiative Webinar: An ISO-Based Carbon Emissions Cost Adder Approach: How Would It Work? 3 (Oct. 31, 2016), http://environment.law.harvard.edu/wp-content/uploads/2016/11/2016-10-31-HLS-Carbon-Charges-in-Electricity.pdf.

200. *Id.*

201. 16 U.S.C. § 824d(a) (2012) (section 205 of the FPA).

202. *See* Ill. Commerce Comm'n v. FERC, 576 F.3d 470, 476 (7th Cir. 2009).

203. *Id.*

among utilities for a regional transmission line project, Judge Posner reasoned that "FERC is not authorized to approve a pricing scheme that requires a group of utilities to pay for facilities from which its members derive no benefits, or benefits that are trivial in relation to the costs sought to be shifted to its members."[204] This cost causation principle might be construed as a limitation on federal agency use of cross-customer subsidies to finance new transmission line projects, especially where a challenger can point to some evidence of disparate benefits across different customer classes.[205] In reviewing the agency's decision on remand, the Seventh Circuit again rejected a postage-stamp approach to allocating transmission costs for the same transmission line project where there was evidence that the line produced benefits for some customers or little or no benefits for other customers, but no evidence that it produced shared benefits.[206]

As Judge Richard Cudahy noted in a dissent, however, a failure to recognize regional sharing of costs across customer groups will present serious difficulties for new transmission line projects aimed at promoting reliability and new clean-energy resources. In the past, he noted, state regulators approved these kinds of transmission projects, routinely spreading their costs among all of a utility's retail customers.[207] However, the Seventh Circuit's cost causation standard is not as significant of a barrier as it might seem to the use of broad customer subsidies to finance low-carbon investments. Another decision by the Seventh Circuit (also written by Judge Posner) accepted a similar approach to cost allocation for new transmission lines for wind power across all members of an RTO where there was evidence that the lines would not yield highly disparate benefits and FERC had determined that the benefits from the new lines would be spread almost evenly across customers.[208] Thus, while the Seventh Circuit has reminded FERC of the significance of evaluating subsidies through the lens of the cost causation principle, this is not a wholesale rejection of efforts to broadly spread costs for projects that produce widespread benefits: as long as FERC either makes some findings related to or quantifies a project's benefits,

204. *Id.*

205. *See, e.g.*, Gabe Maser, Note, *It's Electric, but FERC's Cost-Causation Boogie-Woogie Fails To Justify Socialized Costs for Renewable Transmission*, 100 GEO. L.J. 1829, 1836 (2012).

206. Ill. Commerce Comm'n v. FERC, 756 F.3d 556, 565 (7th Cir. 2014).

207. 576 F.3d at 478 (Cudahy, J., dissenting).

208. Ill. Commerce Comm'n v. FERC, 721 F.3d 764, 774–75 (7th Cir. 2013).

FERC still can approve inter-customer subsidies in allocating the costs of transmission lines. In addition to focusing on reliability benefits (as was at issue in these cases), FERC could strengthen its regulatory approach to using cross-customer subsidies by making findings or an effort to quantify the carbon-reduction benefits of new transmission lines.

Another legal obstacle to internal subsidies aimed at encouraging low-carbon energy is presented by the federalism scheme of the FPA. The Supreme Court recently held that federal approval of rates in the regulation of competitive wholesale power markets preempts state initiatives aimed at targeting wholesale energy rates by benefitting a specific power supplier.[209] This legal decision has important implications in those areas of the country where FERC regulates rates in organized wholesale power markets. Importantly, it does not appear to affect the ability of rate-regulated utilities to draw on retail customer subsidies to support new infrastructure projects.[210] In addition, as discussed below, the Supreme Court has correctly recognized the continued need for states to draw on a variety of subsidies to promote clean-energy power supply options.[211] Even in areas of the United States where regional power markets thrive, many public goods (including decarbonization) are not presently priced in interstate electric markets.[212] Therefore, state ratepayer subsidies for new low-carbon energy infrastructure that directly target these public-good-related goals, rather than FERC-approved interstate wholesale power prices, should generally not run afoul of federal preemption.[213] States should be well positioned to defend these kinds of internal subsidies by participating in regional initiatives, subject to FERC approval, or by adopting competitive bidding processes for new low-carbon power projects that are not limited to in-state energy resources.

3. Subsidies for Distributed Energy Resources

Energy supply resources that are distributed on a smaller scale, such as commercial and residential rooftop solar, are often financed by utilities through customer or ratepayer subsidies.

209. Hughes v. Talen Energy Mktg., LLC, 136 S. Ct. 1288, 1297 (2016).

210. *Id.* at 1299.

211. *See supra* Part IV.A.

212. *See* Hammond & Spence, *supra* note 16, at 212 (discussing the obstacles regions face when attempting to place value on social costs).

213. The need for FERC to clarify the preemption implications of this legal decision to encourage state subsidies for decarbonized power supply projects is discussed further, *infra* Part IV.A.

One such incentive is net metering, or the requirement that a utility accept the surplus energy produced by customer distributed-solar photovoltaic facilities, typically in exchange for compensating the customer with a per kWh billing credit.[214] Net metering programs are quite popular: they have been adopted in as many as forty-four states,[215] and are typically financed through a utility's general rate base in the rates that all customers pay for energy. As is discussed below,[216] they have also proved controversial.

Several states have also adopted feed-in tariffs, or set payments for each kilowatt hour particular renewable power generation facilities sell back to the distribution grid. A typical feed-in tariff program guarantees payments in dollars per kilowatt hour for a guaranteed period of time for a particular renewable-power technology. FERC has determined that these programs must comply with the 1978 Public Utility Regulatory Policies Act (PURPA) requirement that utilities not be required to purchase customer generation at prices that exceed avoided costs, but states retain considerable flexibility to base payments on the value of renewable generation to the energy system and to society, including environmental externalities and other attributes.[217] One advantage of a feed-in tariff is that it gives a renewable power supplier a dependable, long-term revenue stream, which allows a project developer to obtain lower-cost financing.[218] Feed-in tariff programs nicely track state authority over retail rates and have been particularly effective at promoting renewable-power development when they complement state RPS goals.[219] At the same time, one concern with feed-in tariffs is that

214. *See* EDISON ELEC. INST., SOLAR ENERGY AND NET METERING (2016), http://www.eei.org/issuesandpolicy/generation/NetMetering/Documents/Straight%20Talk%20About%20Net%20Metering.pdf (providing useful background information on net metering).

215. N.C. CLEAN ENERGY TECH. CTR. & MEISTER CONSULTANTS GRP., THE 50 STATES OF SOLAR 8 (2015), https://nccleantech.ncsu.edu/wp-content/uploads/50-States-of-Solar-Issue2-Q2-2015-FINAL3.pdf.

216. *See infra* Part III.C. (discussing the critique that low income customers often cannot afford to participate in net metering programs).

217. *See, e.g.*, Cal. Pub. Utils. Comm'n, 132 FERC ¶ 61,047, 61,338–39 (2010) (noting that California's feed-in tariff program is preempted by PURPA and the FPA).

218. TOBY D. COUTURE ET AL., NAT'L RENEWABLE ENERGY LAB., A POLICYMAKER'S GUIDE TO FEED-IN TARIFF POLICY DESIGN 59 (2010), https://www.nrel.gov/docs/fy10osti/44849.pdf.

219. *See, e.g.*, Felix Mormann, *Clean Energy Federalism*, 67 FLA. L. REV. 1621, 1656 (2015) (arguing that in the United States, feed-in tariffs are best

they require regulators to pick technological winners and losers, a concern that could be addressed if tariff rates are set based on a competitive bidding process that recognized each resource's value to energy system.

C. ALLOCATING SUBSIDIES IN RETAIL CUSTOMER CHARGES

Rate design is the process by which these internal subsidies are allocated among utility customers.[220] Where public taxation does not pay for the costs of energy infrastructure investments, additional charges in retail customer bills are often necessary. Regulators' approaches to setting customer charges have important implications for economic efficiency and consumer welfare, because these charges can influence the quantity of energy consumed, as well as basic fairness among customers.[221] Utilities historically set retail customer bills with fixed (or demand) and variable (or energy) charge components. As utilities increasingly pursue new low-carbon energy infrastructure, retail customer bills are likely to see a significant increase in demand charges, as there is a need for high front-end project costs.[222] If not approached carefully, this can have adverse consequences for both economic efficiency and consumer welfare.

First, allocating significant costs to all retail customers based on a demand charge distorts pricing signals and promotes wasteful energy consumption. A problem with demand billing charges is that they do not accurately price energy based on the amount consumed: once the fixed-cost component of a bill is paid, a customer is incentivized to consume more units of energy, as this reduced the per-unit cost. It is thus important for regulators to set fixed charges for various customers, especially larger commercial and residential customers, at higher levels, and to retain a significant variable cost charge in these customers' bills. Industrial and commercial customers whose usage of energy relies more heavily on fossil fuel resources, including peaking gas plants, must face signals that encourage them to adjust the

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addressed at the state level where tariffs and incentives can be tailored to local needs).

220. Rate design receives little discussion in debates surrounding climate policy. For a notable exception, see William Boyd & Ann E. Carlson, *Accidents of Federalism: Ratemaking and Policy Innovation in Public Utility Law*, 63 UCLA L. REV. 810 (2016) (examining several recent ratemaking innovations).

221. *Id.* at 864; *see also* EDISON ELEC. INST., *supra* note 214 (discussing how rooftop solar customers avoid paying fixed grid costs).

222. N.C. CLEAN ENERGY TECH. CTR. & MEISTER CONSULTANTS GRP., *supra* note 215.

quantity of energy consumed to avoid waste and to promote the goals associated with other policies, such as decoupling.

Second, if not approached with care, allocating the costs of mandates and subsidies through fixed customer charges can disproportionately burden those customers who can afford it least, leading to regressive distributional impacts. As used in tax policy discussions, horizontal equity refers to the notion that similar individuals with similar incomes and assets should pay similar tax rates.[223] Energy law incorporates this notion of horizontal equity in the common principle (routinely embedded in statutory rate mandates[224]) that regulators setting rates must protect against rate discrimination by ensuring that similarly situated customers pay similar charges for the benefits they receive. As discussed above, for example, recent litigation surrounding subsidies in the allocation of costs for new transmission lines has required FERC to ensure that customers who benefit in a similar manner are allocated similar costs.[225]

In setting customer charges for a decarbonized grid, policymakers must also be attentive to how the agency's nondiscrimination mandate extends to potential competition (not only existing customers or suppliers) and to substitutes for the consumption of electric power, such as conservation or customer self-generation. In tax policy, vertical equity evaluates how tax impacts vary across individuals with different wealth characteristics, to assess the distributive consequences of different tax approaches.[226] While often ignored in energy and environmental regulation contexts,[227] attention to vertical equity in energy law would require an agency evaluating discrimination in setting

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223. *See* Borris I. Bittker, *Equity, Efficiency, and Income Tax Theory: Do Misallocations Drive Out Inequities?*, 16 SAN DIEGO L. REV. 735, 735–36 (1979); *see also* Joseph J. Cordes, *Horizontal Equity*, *in* THE ENCYCLOPEDIA OF TAXATION AND TAX POLICY 195, 195 (Joseph J. Cordes et al. eds., Urban Institute Press 1999).

224. *See* 16 U.S.C. § 824d(a) (2012) (requiring FERC to set electric utility rates that are "just and reasonable"); *id.* § 824e(a) (stating rates cannot be "unduly discriminatory").

225. *See supra* Part II.B.2.b (discussing the difficulties faced when allocating costs to customers from different jurisdictions).

226. Bittker, *supra* note 223, at 735–36 ("Equity theorists ask whether existing law treats equals equally (horizontal equity) and whether it differentiates appropriately among unequals (vertical equity).").

227. One exception, that considers time as well as vertical equity, is Brian Galle & Manuel Utset, *Is Cap-and-Trade Fair to the Poor? Shortsighted Households and the Timing of Consumption Taxes*, 79 GEO. WASH. L. REV. 33 (2010).

rates to assess how customers with different wealth characteristics may bear a disproportionate share of costs. As an example, it is not uncommon in rate design for residential customers to be allocated the primary burden for peak capacity necessary to deliver firm (also known as uninterruptible) power to them, while industrial customers may only pay energy costs in what is known as interruptible rates. This results in a higher demand component in residential, as opposed to industrial, rates, but perversely it can also result in a class of customers with less wealth paying for more of a utility's fixed costs.[228] In the rate design process, it is important for regulators to ensure that residential customers are not forced to pay excessively for components of the fixed charges associated with lower-carbon energy resources that benefit the energy system as a whole or that benefit other customer classes, including large commercial and industrial customers.

Decisions about the cost allocation for new projects should be open and transparent, and should allow for participation of a broad range of customer interests. To protect vertical equity concerns, regulators should avoid approving the allocation of all costs for new energy infrastructure projects into fixed charges for customers. Similarly, even fixed surcharges for all customers for new projects should generally be avoided. One increasingly common example of a customer surcharge is an environmental adder, though fixed adder charges that apply to every customer's bill are regressive and should be avoided.[229] In contrast to approaching cost allocation for all new infrastructure in fixed charges or additional retail customer demand fees, a variable carbon adder (at levels that increase based on customer kWh energy usage) can allow cost recovery for new decarbonization infrastructure without encouraging wasteful consumption or impairing customer fairness goals.[230] Customers who use more energy would pay more under this approach, since it would impose the greatest burden on those customers whose energy usage generates the most significant carbon pollution.[231] Such an approach is consistent with traditional ratemaking principles insofar as (in symmetry with horizontal cost causation principles) it

228. Boyd & Carlson, *supra* note 220, at 864.

229. For further discussion of environmental adders, see Keske et al., *supra* note 181.

230. Chang, *supra* note 199, at 3.

231. *Id.* at 3–4.

ties the costs of various activities that require energy to the burden that each customer imposes on the energy system and its related social goals, including decarbonization. In contrast to conventional utility rate design, this approach spreads the burden of new programs more broadly among all customers in a manner that is proportionate to the burden each customer imposes on the system.

As an illustration of how customer charges may have a disproportionate adverse impact for the poorest customers, consider net metering—a policy authorized in more than forty states that allows residential customers installing solar arrays to receive a billing credit for each kilowatt hour of surplus solar power that is provided to the grid.[232] Net metering is sometimes criticized as a regressive policy, insofar as it burdens all customers for facilities that only benefit investments made by middle-class or wealthier customers.[233] Such concerns are probably overstated, especially to the extent that regulators have failed to explain the system-wide benefits that customer solar can produce for a resilient energy grid. However, to the extent that some low-income customers cannot afford to participate in net metering programs, the regressivity concerns are not entirely unfounded. The regressivity effect can be further exacerbated if net metering customers place a disproportionate burden on the grid and if low-income customers are forced to pay for this. Regulators might address these vertical equity concerns by waiving any fixed charge associated with participating in net metering programs for low income customers, shifting a portion of fixed charges to those customers who are likely to benefit most from net metering. Alternatively, they might offer community solar or provide low-income assistance or interest-free loans or property-tax credits to encourage customer energy resource deployment among low-income customers.

IV. UNLEASHING INTERNAL SUBSIDIES FOR A LOW-CARBON FUTURE

Significant reforms to existing law and regulation will prove necessary to meet carbon reduction targets. Drawing in part on Posner's important insight that regulation operates as a form of taxation, as gauged against basic principles of sound institutional design of a carbon tax, addressing carbon reduction

232. *See* Jim Rossi, *Federalism and the Net Metering Alternative*, 29 ELECTRICITY J. 13, 13 (2016).

233. Boyd & Carlson, *supra* note 220, at 864.

through internal subsidies leaves many important efficiency and social welfare issues unaddressed.[234]

Some basic policy guideposts can inform and clarify policy choices as they unleash the carbon tax potential of internal subsidies. These guideposts will require regulators relying on internal subsidies for carbon reduction to identify the most efficient customer base for sharing the burden of important public goods, such as carbon reduction and grid reliability. They also will require regulators to be more attentive to both horizontal and vertical equity in applying nondiscrimination principles in setting internal subsidies and the rules for energy markets. Too, regulators must explicitly address spillover and regulatory arbitrage opportunities presented by the diversity of regulatory approaches. In short, to the extent regulators see internal subsidies as producing the same public goods as a carbon tax, they need to approach internal subsidies with same principles that would apply under a carbon tax. Whether or not a carbon tax is ultimately adopted, such an approach will better align regulatory goals with the promotion of efficiency and social welfare in the transition to a low-carbon grid.

A. POLICY GUIDEPOSTS

Existing approaches to internal subsidies provide several lessons and opportunities for improvement as regulators look to improve the provision of public goods in interstate energy markets, such as greater reliability and carbon reduction. However, the fragmented approach to internal subsidies among state regulators remains inconsistent and faces tension with modern energy markets. Going forward, policymakers can improve internal subsidies by looking to the core principles that inform design of a carbon tax: neutrality, cost spreading, fairness and equity, and evenhandedness.[235] At the same time, the fragmented nature of internal subsidies will require regulators to confront some unique challenges. Five basic policy guideposts can assist energy regulators in better aligning internal subsidies with the principles that would inform the optimal design of a carbon tax:

1. Resource and incumbent neutrality should be the presumptive starting point in imposing any internal subsidies. To the extent that mandates or requirements apply in different

234. *See* Posner, *supra* note 11, at 22.
235. *See supra* Part II.D.

manners across various energy resources (as do RPS requirements), they should be presumptively authorized for recovery through internal subsidies in customer rates, with an eye towards maximizing the base of customers who will pay for them.

2. To the extent that public goods (such as decarbonization goals) are not fully priced in energy markets, in approving new regulatory mandates and internal subsidies, both federal and state regulators should make findings of benefits include public good that they produce (such as carbon reduction).

a. Presumptively, internal subsidies to advance low-carbon grid infrastructure should be spread as broadly as possible among the ratepayers who benefit from them.

b. Neither the finding of benefits nor a proportionate assessment of their burdens needs to be limited to a particular jurisdiction.

c. Regulators setting subsidies should be attentive to spill over costs, including carbon leakage problems, and should make appropriate boarder adjustments or appeal to regional or national regulators to address these concerns.

3. Regulators should favor internal subsidies that allow for flexibility in energy resource investment decisions, rather than those that promote technological lock-in. For example, rate regulators should be encouraged to adopt pre-construction ratepayer subsidies for new low-carbon investments with high front-end fixed costs, while also retaining flexibility to reallocate these funds (rather than refund them to customers) if later developments deem a specific project imprudent.

4. While federal subsidies to produce public goods should not be disfavored, especially as a way of correcting for market distortions, federal regulators need to recognize a complementary role for states.

a. Federal regulators should encourage subnational experimentation with subsidies, treating any federal requirements or internal subsidies as floors, and should not be allowed to crowd out more stringent state standards or innovations that advance the same public goods.[236]

b. Subnational internal subsidies should be considered presumptively consistent with interstate energy markets where they demonstrate benefits and make an effort to im-

236. For a discussion of the experimentation and innovation associated with federalism, see Boyd & Carlson, *supra* note 220, at 884.

pose burdens that are roughly commensurate with those benefits.

5. Customer cost allocation, including retail charges, should be set in a manner that is not only mindful to narrow notions of horizontal equity among energy suppliers, or merely treating like customers alike.

a. Subsidies between customers must also be transparent and attentive to the impacts of various customers, as well as distributional notions of vertical equity and customer fairness.

b. To ensure more rational price signals that avoid wasteful consumption, regulators should presumptively set demand charges in customer bills based on total energy consumption, rather than using fixed fees that impose costs across all customers regardless of how much energy a customer consumes.

Based on these principles, the following sections survey some of the most promising policy responses by states and agencies, as well as Congress, to scale up and recalibrate internal subsidies to better unleash their potential for carbon reduction while also promoting efficiency and social welfare.

B. STATE REFORMS TO CARBON TAXATION BY REGULATION

Given their roles in approving new energy infrastructure policies and in setting retail rates, states will play an integral role in the use of internal subsidies to facilitate grid decarbonization. While many states already use forms of carbon taxation by regulation, there is considerable room for improvement as states scale up, improve, and better coordinate their approaches. In order to avoid tension with interstate energy markets, states need to (1) better articulate and explain the benefits of internal subsidies, with a focus on energy system benefits; (2) be more mindful of spillover effects and provide for corrective measures; and (3) embrace regulatory approaches that are flexible and that address fairness and equity concerns.

1. Articulating and Explaining Benefits

Most states relying on internal subsidies impose these to pay for the costs of anticipated future energy needs provided by a specific energy resource. Where there is a good reason related to the energy system for making a distinction between different energy resources in the design of internal subsidies, states may be justified in allocating costs differently for some customers.[237] In designing subsidies, however, states often proceed incrementally and pay little or no attention to broader energy system benefits or to how various subsidies interact. Apart from a regulatory conclusion that there is a need for a project and that it imposes prudent additional costs on ratepayers, little or no effort is typically made to articulate or explain the public goods associated with these subsidies. Nor do state regulators make much effort to match the benefits of these subsidies with the customer base that benefits from them.[238]

States will likely continue using mandates such as RPS standards to aim towards targets of fifty percent, eighty percent, and, in some instances when land and natural resources allow, even one hundred percent renewable energy targets. When revisiting these requirements, states should evaluate each power generation option that qualifies for an RPS for its carbon reduction value, better aligning RPS credits with the deep decarbonization attributes for each resource. States can also improve enforcement and minimize carbon leakage by participating in

237. Beyond internal subsidies, neutrality is a broader concern with much state utility regulation. In order to ensure a level playing field for new power generation technologies, states should remove embedded regulatory barriers that serve as a subsidy in favor of incumbent firms and impede new non-utility renewable power projects. Regulators should remove prohibitions on non-utility applicants for project siting, and should favor efforts to unbundle generation from distribution in making decisions about new projects. In approving new projects, state regulators should avoid traditional least-cost assessments that fixate solely on a project's costs to investors and ratepayers, instead favoring evaluation of the system-wide project costs and benefits for each new project. They also should favor integrated planning approaches that compare the social costs and benefits of various projects. For a discussion of these concerns, see Brown & Rossi, *supra* note 97.

238. As another way of promoting resource and incumbent neutrality, states might consider revising the role of the distribution utility, not merely as a business that sells power but as the provider of energy value for a decarbonized grid. In order to better align customer incentives with the pricing of energy, states should also aim to facilitate adoption of incentives that enable customer behavior/investment choices, including decoupling, customer demand response, and deployment of smart metering. In order to encourage decisions about new power-supply resources that do not favor incumbent utilities and their existing power-supply resources, states should consider adopting an Independent Distribution Service Operator (IDSO) approach that unbundles management of the distribution grid (including customer energy resource interconnection and access) from decisions regarding power supply. *See, e.g.*, Herman K. Trabish, *Jon Wellinghoff: Utilities Should Not Operate the Distribution Grid*, UTILITY DIVE (Aug. 15, 2014), http://www.utilitydive.com/news/jon-wellinghoff-utilities-should-not-operate-the-distribution-grid/298286.

regional efforts to align RPS requirements. They should authorize the costs of compliance with these requirements to be recovered in customer rates, with particular attention to expanding the customer tax base by spreading their costs as broadly as possible.

Under federal law, states are specifically assigned the role of setting avoided-cost rates as subsidies for encouraging non-utility forms of power generation, including renewable power projects.[239] In approaching avoided costs under PURPA, states should not limit their inquiry to short-run marginal economic costs of deploying existing power generators, which systematically favors resources such as natural gas. Rather, regulators should set avoided costs based on the future system-wide marginal cost specific to each resource, including environmental and other social costs associated with deep decarbonization. One way to accomplish this is to separately auction each desired energy supply resource, as determined by statewide or regional planning for future energy resource balance.

States that have not done so should adopt net metering programs and, at the very minimum, billing credits should be set based on retail rates. States should also consider the adoption of feed-in tariff programs, with an eye towards providing long-term financial stability for targeted low-carbon power generation options. States with these programs should expand them based on the decarbonization attributes of different technologies, and routinely revisit that system-wide value of each resource vis-à-vis decarbonization. As with RPS requirements, the costs of these subsidies need to be authorized in customer rates and their costs spread as broadly as possible.[240]

Beyond resource-specific mandates, states can also be expected to continue to pursue new subsidies for their own new low-carbon infrastructure projects. States need to be particularly attentive to ensuring resource and incumbent neutrality when

239. *See* Richard D. Cudahy, *PURPA: The Intersection of Competition and Regulatory Policy*, 16 ENERGY L.J. 419, 430–31 (1995) (explaining that states must consider prices from all energy sources when setting avoided cost).

240. Such subsidies should not be limited to states, but should recognize the potential of urban areas to finance their own initiatives along the lines of similar principles. State legislatures and regulators should encourage local governments to set their own goals and establish their own subsidies to help build clean-energy infrastructure, especially to the extent that this allows a municipal government to draw on tax-free financing options. To encourage experimentation, states should not limit the ability of local governments to adopt their own PACE programs, RPS and energy efficiency mandates, and incentive programs such as net metering.

designing these subsidies. They must also articulate and explain how these subsidies produce public goods that are not priced in by the interstate energy market. Subsidy design costs should be assessed to customers in a manner that is roughly proportionate to benefits—even where those who benefit from a subsidy are out of state. States should be mindful that stable regulatory incentives can play an important role in reducing the uncertainty associated with low-carbon infrastructure,[241] but to retain flexibility in financing new projects, carbon investment adders could be used to establish a state or regional fund and to offer competitive bidding for new low-carbon infrastructure projects.[242]

Though forms of subsidies, the types of state initiatives described above should be presumptively favored in interstate energy markets, despite recent case law that calls into question some state subsidies in interstate power markets. In 2016, the U.S. Supreme Court rejected Maryland's incentives for the construction of new natural gas plants, holding that they were preempted by FERC's regulation of regional market rates for competitive wholesale power supply in the interstate market.[243] Read at face value, this decision calls into question many state power generation subsidies—an especially troubling development given the need for new decarbonized sources of energy.

The Maryland incentives for gas plants rejected by the Supreme Court were preempted by federal law because they disregarded a wholesale capacity sales rate FERC had presumptively approved as just and reasonable as a part of a multistate tariff proposed by PJM, the largest organized RTO market in the United States.[244] Importantly, the Supreme Court's decision does not affect the ability of regulated utilities that do not participate in organized regional markets regulated by FERC to build subsidies for power supply resources into their retail rates. Moreover, as the Supreme Court clarified, its holding is narrow scope and does not "foreclose Maryland and other States from

241. *See, e.g.*, Jonas J. Monast, *Maximizing Utility in Electric Utility Regulation*, 43 FLA. ST. U. L. REV. 135, 160 (2015) (discussing how uncertainty about future carbon policy can produce harmful efficiency and social welfare effects for customer rates).

242. *See supra* notes 199–200 and accompanying text.

243. Hughes v. Talen Energy Mktg., LLC, 136 S. Ct. 1288, 1299 (2016).

244. *Id.* at 1294 (citation omitted) ("FERC extensively regulates the structure of the PJM capacity auction to ensure that it efficiently balances supply and demand, producing a just and reasonable clearing price."); *see also id.* at 1299 ("We reject Maryland's program only because it disregards an interstate wholesale rate required by FERC.").

encouraging production of new or clean generation through measures 'untethered to a generator's wholesale market participation.'"[245] The Court specifically refused to rule on "the permissibility of various other measures States might employ to encourage development of new or clean generation, including tax incentives, land grants, direct subsidies, construction of state-owned generation facilities, or re-regulation of the energy sector."[246] Recent lower court decisions have resoundingly rejected preemption challenges to state subsidies for nuclear power plants,[247] suggesting that initiatives aimed to promote low-carbon energy resources will likely be allowed to withstand any legal scrutiny this 2016 Supreme Court decision invites.

While state carbon subsidies may withstand legal challenge in interstate energy markets, to ensure consumer protection and neutrality towards new energy resources, stranded-cost compensation favoring legacy power generators should be approached with caution. Unless policymakers make a concerted effort to assess the carbon costs and broader energy-system benefits associated with regulatory transitions, they should generally disfavor stranded-cost compensation for incumbent power-supply resources.[248]

2. Addressing Jurisdictional Spillovers

In setting internal subsidies, states also need to be attentive to jurisdictional spillovers, such as carbon leakage. Differences in regulatory mandates and subsidies across jurisdictions can exacerbate leakage, especially when while these differences are not tied to spillover benefits.

To the extent states are using internal subsidies to advance public goods associated with broader energy system, such as new transmission lines to promote carbon reduction and reliability,

245. *Id.* at 1299.

246. *Id.* For further discussion, see Jim Rossi, *The Brave New Path of Energy Federalism*, 95 TEX. L. REV. 399 (2016).

247. *See, e.g.*, Coal. for Competitive Elec., Dynegy Inc. v. Zibelman, No. 16-CV-8164 (VEC), 2017 WL 3172866 (S.D.N.Y. July 25, 2017) (rejecting challenge to New York's zero emission credit program on the grounds that challengers had failed to distinguish the program from renewable energy credits, which FERC had approved under the FPA); Vill. of Old Mill Creek v. Star, Nos. 17 CV 1163 & 17 CV 1164, 2017 WL 3008289 (N.D. Ill. July 14, 2017) (rejecting preemption clause challenge to Illinois zero emission credits for nuclear plants on the grounds that there is no conflict with any existing FERC policy).

248. *See* Hammond & Rossi, *supra* note 16.

they have the authority to impose some costs on out-of-state producers and, to a degree, even consumers who benefit from them.[249] Regulators might accomplish this through border adjustment fees on energy imports or exports, as long as these adjustments are proportionate to carbon and energy system impacts and reciprocal across jurisdictions.[250] Alternatively, a state could authorize or mandate transmission-owning utilities to participate in a regional energy market (such as an RTO) that provides for some carbon-costing mechanism. These kinds of trans-state initiatives may seem far-fetched, but some states could find them attractive as a way of warding off national adjustments through interstate energy markets.

Effectively addressing spillover concerns may also require some realignment of regulatory institutions within states. Instead of leaving all electric-power policy decisions to a public service commission focused on narrow protection of captive consumers, states' utility commissions need to better coordinate their internal subsidy policies with broader energy system goals. To recognize the interstate concerns associated with this and improve communication across states, states might consider creating an office of energy or establishing some other gubernatorial-level agency that has oversight authority over basic energy policy decisions with spillover costs and benefits, providing an opportunity to balance and tradeoff various values associated with a low-carbon transition and to address concerns such as reciprocity with other states in the operation of energy markets.[251] State legislatures should authorize state energy officials to participate in regional discussions, including interstate compact initiatives related to energy resources and electric power transmission.

3. Fairness and Equity

State utility regulators setting customer rates should move beyond their fixation on nondiscrimination as a principle that

249. *Cf.* Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070, 1087–93 (9th Cir. 2013) (upholding a state renewable fuel standard against a dormant commerce clause challenge even though it imposed a higher burden on out of state producers, based in part on recognition that it created benefits beyond California's border).

250. *See id.* at 1092–94 (upholding a state renewable fuel standard in part because it was focused on actual carbon emissions and applied to both in- and out-of-state producers).

251. This may require reform to ex parte communication limits so that, outside of disputed cases, energy regulators are allowed to discuss policy priorities and their alignment with other state officials.

only protects horizontal equity, or treating all retail customers alike. While horizontal equity represents an important dimension of any just, reasonable, and nondiscriminatory rate, it is not the only relevant consideration. Vertical equity concerns must also be considered. In setting subsidies, regulators need to focus on the customer fairness and distributional consequences of different pricing approaches. This is particularly important as regulators adopt and reassess customer surcharges and billing credits related to net metering, but by no means should it be limited to this context.

In addressing these concerns in customer billing charges, regulators confront customer charges with an eye towards transparency. As a general matter, regulators should avoid setting or adjusting customer charges: (1) in narrowly focused proceedings; or (2) in reaction to concerns about customer cost impacts of a specific program without looking to broader customer impacts and overall energy system benefits. They also should be mindful of customer ability to pay insofar as it can affect customer substitution away from energy resources, and where this concern is warranted, impose resource-neutral customer exit fees.[252] Where regulatory requirements or internal subsidies are paid for through customer billing charges, regulators should presumptively favor per kWh customer charges rather than fixed fees or cost adders which apply equally to all customer bills. In designing these charges, broader energy system benefits, including demand reduction and conservation, also need to be taken into account, recognizing that in some instances some customers should pay a higher price for energy based on consumption levels.

252. Resource neutrality is an important condition to such exit fees. For example, if a utility offers a rooftop solar program that allows for third-party financing, then it might be appropriate for a utility to limit the ability of customers to exit for purposes of participating in another rooftop solar financing program. However, if like most utilities in the U.S., no third-party financing option is made available to customers, it would not be resource neutral for a utility to impose an exit fee or for it to prohibit customers from participating in such a program. For a parallel approach to addressing neutrality concerns in utility regulation, see SZ Enterprises, LLC v. Iowa Utils. Bd., 850 N.W.2d 441, 466–68 (Iowa 2014), *as corrected* (Aug. 14, 2014) (noting that a third-party solar provider transaction is not subject to state utility regulation because the incumbent utility does not offer customers the same services).

C. FEDERAL AGENCIES AND THE EXPANSION OF INTERNAL SUBSIDIES

Even if Congress does not take any action related to grid decarbonization, under existing law federal agencies have authority to take significant steps on their own. This Section details a few immediate and long-term initiatives FERC and the Environmental Protection Agency (EPA) can pursue to leverage the better use of internal subsidies in the transition to grid decarbonization. These policy approaches do not require any additional congressional authorization and reinforce embedded principles of ratemaking:

1. Encouraging the Pricing of Public Goods in Energy Markets

EPA is the primary regulator of environmental emissions and related harms, not FERC. However, in making decisions surrounding energy infrastructure, FERC has many opportunities to consider the carbon impacts of its regulatory decisions.[253]

The agency's determinations on just and reasonable rates in interstate power markets give it substantial leeway to determine what does and does not produce value in interstate power markets, and to set market prices to correct for any disparity between energy-system value and market price. Since each energy resource has a different impact on the power grid, a failure to recognize the carbon or reliability attributes of different energy sources in energy market prices can cause distortions in market pricing. Under the FPA just and reasonable rate principle, FERC has the authority to adopt grid-system-reliability adders reflecting the carbon attributes of different energy resources when approving regional transmission rates for the sale of energy in interstate wholesale power markets.[254] Such charges would

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253. Elsewhere, FERC has been criticized for failing to sufficiently consider carbon impacts in its decisions approving electric power and natural gas projects over which it has jurisdiction. *See* Michael Burger & Jessica Wentz, *Downstream and Upstream Greenhouse Gas Emissions: The Proper Scope of NEPA Review*, 41 HARV. ENVTL. L. REV. 109, 137–38 (2017) (listing a series of cases involving FERC's application of NEPA). In approving natural gas pipelines, FERC also needs to be more attentive to long-term downstream carbon impacts and needs to better engage state environmental regulators in its decision-making process. *See* Alexandra Klass & Jim Rossi, *Reconstituting the Federalism Battle in Energy Transportation*, 41 HARV. ENVTL. L. REV. 423 (2017).

254. *See, e.g.*, [2 FERC] STEVEN WEISSMAN & ROMANY WEBB, U.C. BERKELEY CTR FOR. L., ENERGY, & ENV'T, ADDRESSING CLIMATE CHANGE WITHOUT LEGISLATION, § 3.1–.2 (July 2014), https://www.law.berkeley.edu/files/CLEE/FERC_Report_FINAL.pdf (discussing FERC's regulatory jurisdiction over

probably require FERC to make a finding that regional transmission system adequacy would be imperiled without the reliability attributes provided from non-fossil fuel energy resources.[255]

As a pathway for integrating carbon costs into energy markets without setting a nationwide carbon price, FERC could adopt regulations encouraging regional power markets to develop their own carbon adders for transmission service. Perhaps where an RTO has not done so, FERC (in consultation with EPA) could set default adders for transmission rates in each region of the country. Like environmental adders in utility rates, the additional revenues collected from these system-reliability adders could directly flow back to the power suppliers creating this value, providing additional incentives for their participation in interstate power markets. Alternatively, additional revenue could fund state initiatives to promote low-carbon resources and be allocated to private firms based on competitive bidding. Regions that have adopted carbon cap-and-trade initiatives that extend to all sources of power supply should be entitled to some relief from these adders, but FERC (in consultation with EPA) could provide for appropriate adjustments. An advantage of these kinds of adders is that they could be passed on to retail customers based on prices determined in the interstate market without each state making its own cost-of-carbon determination.

Even without endorsing energy market prices that reflect the carbon attributes of various energy resources, FERC could help promote resource neutrality in its approval of transmission-operator dispatch-priority rules. Current grid operator dispatch protocols favor least-cost deployment of power-supply resources, which advantage existing fossil fuel baseload resources over renewable energy resources. FERC needs to adopt a rule or guidance document addressing the expectations for resource prioritization in organized wholesale power markets. Rather than favoring least-cost dispatch, based solely on the marginal economic (or nominal) costs of energy, the agency's policies should encourage grid operators to base their energy dispatch decisions

wholesale markets and stating FERC could include "a carbon adder" in wholesale electricity rates); Christopher J. Bateman & James T.B. Tripp, *Toward Greener FERC Regulation of the Power Industry*, 38 HARV. ENVTL. L. REV. 275, 302–06 (2014) (discussing FERC's rate regulation authority and noting that environmental considerations should not be precluded).

255. *See* Joel B. Eisen, *FERC's Expansive Authority To Transform the Electric Grid*, 49 U.C. DAVIS L. REV. 1783, 1839–40 (2016) (discussing FERC's authority to adopt such a grid system adder).

on the real value of marginal energy resource for the grid—which depends on a balance of reliability, energy security and environmental considerations.[256]

FERC itself does not have the authority to site new sources of power supply (a role the reserved to states under statute), but the FPA gives the agency expansive authority to address practices that affect the sale of energy in interstate commerce.[257] With interstate energy markets, the agency already considers this as including the overall balance of different supply resources that make up each region's power generation portfolio. FERC's Order 1000 envisions that FERC has a role in ensuring that state RPSs and other policies regarding power-generation decisions are taken into account in the regional transmission planning process.[258] In addition to monitoring compliance with Order 1000, FERC might evaluate other ways in which it can encourage the pricing of environmental and reliability attributes of various energy resources in organized interstate power markets, perhaps by requiring RTOs and transmitting utilities to show that they have taken the reliability, energy security and environmental attributes of a power generation portfolio seriously before approving their transmission planning proposals.

FERC may not be able to do all of this on its own. Coordination across federal agencies will also be essential to clarifying priorities in promoting new sources of power generation with the transition to deep decarbonization.[259] Unless a federal statute indicates otherwise, either FERC or the Department of Energy (DOE) should serve as the lead agency in coordinating initiatives related to electric power and a decarbonized grid. Much as in the setting of auto emission standards, information sharing will be integral to this endeavor. Decarbonization initiatives should present a particularly propitious opportunity for FERC and EPA to work together more proactively. It would benefit both agencies to pursue consultation strategies in the early phases of policy

256. *See supra* note 93 and accompanying text (referencing the renewable power industry challenge to PJM's capacity market rules in the D.C. Circuit).

257. 16 U.S.C. §§ 824d, 824e (2012) (sections 205 & 206 of the FPA, respectively); *see also* Eisen, *supra* note 255, at 1791–97 (discussing FERC's regulatory authority under the FPA).

258. Order No. 1000, FERC Stats. & Regs., 136 FERC ¶ 61,051, 18 C.F.R. pt. 35 (2011), *aff'd per curiam*, S.C. Pub. Serv. Auth. v. FERC, 762 F.3d 41 (D.C. Cir. 2014).

259. For a discussion of the benefits and pitfalls of various interagency coordination strategies, see Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. 1131 (2012).

development. In addition, to the extent that the implementation of regulation anticipates future inter-agency conflicts, both agencies should commit to memoranda of understanding and, where appropriate, consider the adoption of binding joint rules to clarify their respective roles.

2. Clarifying Nondiscrimination Principles

As attention to the carbon attributes continues to increase, transmission will remain the lifeblood of interstate power markets. This makes it even more important that FERC get nondiscrimination principles right. Sections 205 and 206 the FPA apply not only to incumbent sources of energy, but can be expected to apply in the future to an even more diverse range of power supply resources.[260] Traditionally, FERC has interpreted nondiscrimination narrowly, to mean not treating different wholesale power supply customers differently. As discussed above, FERC has already begun to endorse broad-based customer subsidies in approving cost allocation for new transmission lines, following a finding of shared benefits or some effort to quantify benefits to customers. Also, as FERC recognized with its demand response order,[261] the notion of nondiscrimination in the FPA authorizes the agency to consider inputs to wholesale power supply sales or related energy services, including customer energy efficiency and other customer resources such as battery storage. With a decarbonized grid, FERC must continue to recognize how its nondiscrimination mandates not only require it to pay attention to *downstream* considerations (such as rates for transmission and traditional bulk power sales), but also consider *upstream* grid inputs (such as customer energy resources that need to connect to the grid) and related energy services that affect interstate power markets.

Moreover, at least to date, FERC has failed to interpret its public interest mandate as extending to the carbon-costs associated with integrating various energy resources into the grid. Under section 210 of the FPA, the agency has the authority to mandate transmission interconnection where it is in the "public

260. 16 U.S.C. §§ 824d, 824e.

261. Order No. 745, FERC Stats. & Regs., 134 FERC ¶ 61,187, 18 C.F.R. pt. 35 (2011), *aff'd*, FERC v. Elec. Power Supply Ass'n, 136 S. Ct. 760, 773–74 (2016), *as revised* (Jan. 28, 2016) (recognizing FERC's authority to regulate wholesale demand response as a "practice[] 'affecting'" its rates, under sections 205 and 206 of the FPA).

interest."[262] FERC could facilitate greater renewable power project participation in interstate power markets by issuing a policy statement finding that interconnections for renewable power facilities presumptively meet the agency's public interest standard.[263]

Related to nondiscrimination is PURPA's requirement that utilities purchase surplus power from certain types of generators, including renewable power projects.[264] Congress initially intended PURPA's purchase obligations to apply to renewable power projects, including nondispatchable resources, such as solar and wind.[265] In 2005, Congress significantly scaled back PURPA's reach, adopting an exemption from PURPA's purchase obligation where utilities lack market power.[266]

But these 2005 amendments to PURPA did not instruct FERC to throw out the baby with the bathwater. If a qualifying renewable power resource lacks access to the wholesale market, due perhaps to transmission constraints of discriminatory pricing, it does not seem appropriate for FERC to allow a finding of no market power. FERC should thus avoid granting broad waivers to utility buyback and avoided-cost obligations for renewable power facilities under the 2005 amendments where market failures impede renewable power projects' access to competitive interstate markets.[267] In similar spirit, FERC could provide a process for states to seek pre-approval of incentives and issue new avoided cost guidelines that provide states presumptive ways to

262. 16 U.S.C. § 824i(c)(1).

263. For a parallel recommendation regarding interconnection, see WEISSMAN & WEBB, *supra* note 254, at 17 (discussing the benefits if FERC issued a policy statement "acknowledging that interconnections for renewable generators will ordinarily meet" FPA section 210 requirements).

264. *See* Exelon Wind 1, LLC v. Nelson, 766 F.3d 380, 384 (5th Cir. 2014) (stating PURPA "requires utilities to purchase power generated by Qualifying Facilities," so long as certain conditions are met, in order to reduce utilities' dependence on foreign energy sources).

265. Based on deference to a state agency, the U.S. Court of Appeals for the Fifth Circuit has held otherwise. *See Exelon Wind*, 766 F.3d at 395–97 (upholding Texas PUC requirement that only qualifying facilities delivering firm power qualify for legally enforceable obligations under PURPA, despite argument that this was inconsistent with FERC's regulations).

266. *See* Energy Policy Act of 2005, Pub. L. No. 109-58, sec. 1253, § 210, 119 Stat. 594, 967–70 (2005) (codified as amended at 16 U.S.C. § 824a-3).

267. For a similar recommendation, see WEISSMAN & WEBB, *supra* note 254, at 10–11 (stating "[c]areful consideration" should be given to exercising FERC's power to exempt utilities from their obligation under PURPA).

comply with PURPA, with avoided-cost programs promoting low-carbon power supply.[268]

Also, to date FERC has failed to recognize how power distribution sometimes produces discriminatory effects in interstate wholesale markets. While states retain primary authority over power distribution facilities and retail sales under statute, certain aspects of distribution that impede a competitive and fair interstate power market potentially extend into FERC's jurisdictional wheelhouse. FERC might consider drawing from its successes in encouraging formation of RTOs to make necessary market discrimination findings and adopting a similar rule to encourage formation of wholesale Distribution Service Organizations (DSOs)—at least to the extent DSOs engage in power sales transactions subject to FERC's jurisdiction. Like FERC's RTO rule, such an approach need not be mandatory but could allow utilities to participate in distributed wholesale markets to opt in to FERC regulation of certain transactions, as long as they voluntarily unbundle distribution from generation. A standard wholesale DSO tariff could enable and allow for distribution interconnection standards. As important, it would help to facilitate nondiscriminatory pricing for distributed customer energy resources, including residential solar, and energy storage and demand response, especially in states that prohibit these resources from accessing the interstate wholesale market. FERC's endorsement of such an approach would encourage more states to consider their own initiatives to promote fair competition in retail electric-power distribution activities, which remain within state jurisdiction.[269]

3. Reducing Federalism Uncertainty

As discussed above, a 2016 U.S. Supreme Court decision calls into question some state subsidies that present distortions

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268. While FERC has provided little in the way of systematic policy updates to its original avoided-cost regulations, a number of government and private reports have surveyed and evaluated various avoided cost methodologies. *See, e.g.*, PAUL DENHOLM ET AL., NAT'L RENEWABLE ENERGY LAB., METHODS FOR ANALYZING THE BENEFITS AND COSTS OF DISTRIBUTED PHOTOVOLTAIC GENERATION TO THE U.S. ELECTRIC UTILITY SYSTEM (2014), https://www.nrel.gov/docs/fy14osti/62447.pdf; GREG DOTSON & BEN BOVARNICK, CTR. FOR AM. PROGRESS, A FORWARD-LOOKING AGENDA FOR THE NATION'S PUBLIC UTILITY COMMISSIONS (2015), https://cdn.americanprogress.org/wp-content/uploads/2015/05/PURPA-report-final.pdf.

269. *See supra* Part IV.B.

to interstate power markets as regulated by FERC.[270] To date, legal challenges to state subsidies on preemption grounds following this 2016 decision have not been successful.[271] Still, much uncertainty continues to surround state subsidies, especially subsidies aimed at promoting nuclear power. FERC could reduce this uncertainty by clarifying the continued permissibility of state clean-energy incentives and subsidies unless FERC expressly preempts them in a specific context, for example, via adjudicative order or adoption of a notice-and-comment rule. Such an approach might presumptively favor state internal subsidies that are explained on terms of carbon reduction or reliability benefits as long as some effort is made to address their spillover implications, so as to minimize distortions in interstate energy markets.

D. A LEGISLATIVE PLATFORM FOR CARBON TAXATION BY REGULATION

As I have argued, it is not necessary for Congress to adopt a national tax in order for carbon taxation by regulation to more effectively advance a low-carbon energy grid. But without doubt, additional legislation could provide a platform for unleashing the potential of internal subsidies. Even if Congress does not adopt any new federal requirements for private firms or states, with only modest adjustments to existing law it can significantly improve the coordination of internal subsidies by improving the information available to firms and policymakers and leveling the investment playing field for low-carbon infrastructure.

1. Coordinating State Clean Energy Requirements

Congress could play an integral role towards better aligning state requirements and internal subsidies to avoid negative jurisdictional spillover effects, such as carbon leakage, in interstate energy markets. RPS requirements, used by more than half the states today, demonstrate the need for better interstate coordination. Recognizing the successes in more than half the states with RPS and EERS requirements, Congress could minimize tensions that state programs present for interstate power

270. *See supra* notes 243–46 and accompanying text (discussing Hughes v. Talen Energy Mktg., LLC, 136 S. Ct. 1288 (2016)).

271. *See supra* note 247 and accompanying text (discussing litigation post-*Hughes*).

markets by adopting a national clean energy standard (CES).[272] A CES considered by Congress in 2012 (in legislation proposed by New Mexico Senator Jeff Bingaman) would have adopted a standard of eighty-four percent clean energy by 2035, although this draft legislation included partial credits for natural gas, nuclear and hydro-electric power.[273] The EIA estimated that this proposed national CES would produce a twenty percent reduction in electric power sector carbon emissions by 2025 and a forty-four percent reduction by 2035—with a modest impact on customer rates (less than four percent by 2025 and eighteen percent by 2035).[274]

If Congress were to set an ambitious national standard for renewable energy, one approach would be to draw on the consensus of state approaches, which already set targets for participants in most energy markets. A national target could be set to automatically ratchet up every five years to require a renewable power target based on the average of existing state targets for that period.[275] Drawing from other cooperative federalism approaches in energy and environmental legislation, such a national CES requirement could serve as a regulatory floor, allowing states to adopt more stringent standards.[276] Additionally,

272. A national CES mandate would integrate both renewable and energy efficiency credits based on energy sales, and could be applied directly to utilities (based on the approach of state RPS and EERS programs) or against individual states (based on the approach of cooperative federalism statutes such as the Clean Air Act). Alternatively, Congress could follow the approach of most states and adopt separate quotas for renewable energy and energy efficiency; this dual target approach is important to ensuring that energy efficiency is not relegated a back seat to the expansion of power supply resources, although this concern can also be addressed by including a minimum energy efficiency "carve out" within an integrated national CES.

273. *See* U.S. ENERGY INFO. ADMIN, ANALYSIS OF THE CLEAN ENERGY STANDARD ACT OF 2012, at 1 (2012), https://www.eia.gov/analysis/requests/bces12/pdf/cesbing.pdf. The non-hydro renewable power portion of this target was estimated as roughly twenty-five percent. *See id.* at 7.

274. *Id.* at 4; *see also A Clean Energy Standard Could Reduce Electric Sector Carbon Dioxide Emissions*, U.S. ENERGY INFO. ADMIN. (May 4, 2012), http://www.eia.gov/todayinenergy/detail.cfm?id=6130.

275. For further elaboration of how the national government should adopt more rigorous regulatory standards based on what a plurality, majority, or supermajority of states do, see GANESH SITARAMAN, CTR. FOR AM. PROGRESS, REFORMING REGULATION: POLICIES TO COUNTERACT CAPTURE AND IMPROVE THE REGULATORY PROCESS 7–8 (2016), https://cdn.americanprogress.org/content/uploads/2016/10/31114707/RegulationReformBrief.pdf.

276. *See* Rossi & Hutton, *supra* note 28, at 1294 (discussing Congress's choice to set the Clean Water Act as a regulatory floor while allowing states to adopt more stringent standards).

Congress should mandate that states provide for retail-rate cost recovery for compliance with a national CES.[277]

Independent of whether Congress adopts a national CES requirement, legislation could easily correct some important defects current state RPS plans present for energy markets. One modest approach would be to create a national clean-energy credit program to facilitate and standardize national markets for tradable credits and address interstate carbon leakage problems. Any national program should allow utilities that do not generate clean energy themselves the flexibility to establish compliance with state programs through the purchase of these credits and to pass on their cost in customer rates.

2. Improving Information About Carbon-Reduction Subsidies

President Obama's administration required agencies subject to presidential oversight to consider a social cost of carbon in agency regulatory initiatives, though the present administration has rejected this approach.[278] In order to provide better information about the use of carbon subsidies, Congress should consider requiring the examination of carbon costs in agency regulatory impact assessment and cost-benefit analysis, including by independent agencies and federal agencies allocating funding to state and local governments.[279] It could begin by applying carbon-impact analysis to its own tax and subsidy initiatives. The

277. Similarly, Congress could adopt a national ZEV mandate, to help ease the fleet transition towards electrification. Even if a federal ZEV standard is not adopted, Congress should authorize NHTSA as well as EPA to adopt credit multipliers for fuel efficiency standards to encourage ZEV alternatives such as electrification. Congress could also clarify that states have authority to adopt their own more ambitious ZEVs, and are not preempted by any federal goals.

278. *See* Press Release, The White House: Office of the Press Sec'y, Presidential Executive Order on Promoting Energy Independence and Economic Growth (Mar. 28, 2017), http://whitehouse.gov/the-press-office/2017/03/28/presidential-executive-order-promoting-energy-independence-and-economi-1; *see also* Dan Farber, *Whither the Social Cost of Carbon?*, LEGALPLANET (May 22, 2017), http://legal-planet.org/2017/05/22/whither-the-social-cost-of-carbon (noting the Trump Administration withdrew the Obama Administration's standard estimate of the social cost of carbon and directed each agency to conduct their own estimate, which could prove scientifically—and legally—difficult); Chelsea Harvey, *The Coming Battle Between Economists and the Trump Team over the True Cost of Climate Change*, WASH. POST (Dec. 22, 2016), http://www.washingtonpost.com/news/energy-environment/wp/2016/12/22/the-coming-battle-between-the-trump-team-and-economists-over-the-true-cost-of-climate-change (observing that the Trump Administration will likely stop considering the social cost of carbon in its rule making process).

279. In similar spirit, Sarah Light has argued that carbon cost disclosure in agency NEPA analysis can serve as a quasi-carbon tax. *See* Sarah E. Light,

Joint Committee on Taxation and other governmental bodies, for example, could evaluate the cost effectiveness of new and existing tax subsidies for various energy sources based on the social cost of carbon. In assessing sunset and reauthorization for tax benefits for various energy resources, it also could provide information regarding the comparative carbon attributes and benefits (if any) associated with each kind of credit or deduction.

Congress also should strengthen EIA's role as an information resource, by requiring it to report annually to Congress regarding progress towards carbon reduction in the energy sector. EIA has advantages over other agencies in measuring carbon emissions related to electric power, given its history of independent collection of information and expertise in the energy sector.[280] EIA should be authorized to collect information, to verify its accuracy and integrity, and build and continuously maintain databases regarding state subsidies and their positive and negative impacts on carbon reduction, efficiency, and social welfare. Such information could prove particularly important in helping states to set fair and reciprocal border adjustments to address any spillover problems such as carbon leakage. EIA should be fully funded to serve as the default agency for more proactively sharing information about carbon reduction activities across DOE, FERC, EPA, the Department of Transportation, and states.

3. Leveling the Playing Field

Current tax incentives are not neutral, favoring projects that produce energy over those that promote efficient use of energy. Congress could advance resource and incumbent neutrality through the reform of existing tax credits and benefits for energy resources. In lieu of existing tax credits, which focus on project investment or production, any favorable tax treatment for a new infrastructure project needs to be tied to the actual value it creates. Favorable tax treatment should not only be extended to projects based on energy production, but to new investments that reduce energy consumption, especially during peak times.

NEPA's Footprint: Information Disclosure as a Quasi-Carbon Tax on Agencies, 87 TUL. L. REV. 511 (2013).

280. *See* Department of Energy Organization Act, Pub. L. No. 95-91, § 204, 95 Stat. 565, 572–74 (1977) (codified as amended at 42 U.S.C. § 7135 (2012)) (establishing the EIA and its mission of "carrying out a central, comprehensive, and unified energy data and information program" to "collect, evaluate, assemble, analyze, and disseminate" energy information and data).

Congress could also adopt legislation to help level the playing field for energy infrastructure investors. Tax-exempt bond status could be extended to "green bond"[281] activities that meet a carbon-benefit test, including those that are issued by special-purposes district governments—for example, municipal government development of brownfield sites for purposes such as renewable power generation. If Congress revisits municipal tax benefits, a social cost of carbon assessment could be used to determine which public energy infrastructure investments decisions qualify for tax-exempt bond financing. In recognition of the fact that neutral access to public capital markets is essential for new investments in low-carbon energy production, adoption of the Master Limited Partnerships Parity Act[282] would extend favorable tax treatment of master limited partnerships and what are known as yieldcos[283]—financing arrangements not presently available for most renewable project investors—on similar terms to those investing in fossil fuel projects.[284] Real Estate Investment Trust (REIT) activities could also be expanded to include low-carbon energy projects related to building efficiency and customer renewable power investments.[285] Finally, local subsidies to promote low-carbon energy could be encouraged with legislation that supports PACE residential programs—for example, requiring the Federal Housing Financing Agency to allow Fannie Mae and Freddie Mac to purchase residential mortgages while

281. *Green Bonds Attract Private Sector Climate Finance*, WORLD BANK (June 10, 2015), http://www.worldbank.org/en/topic/climatechange/brief/green-bonds-climate-finance (stating green bonds "are fixed income, liquid financial instruments that are used to raise funds dedicated to climate-mitigation, adaptation, and other environment-friendly projects").

282. S. 1656, 114th Cong. (2015).

283. *See* Linette Lopez, *Wall Street's Getting Crushed by a Form of Financial Engineering You've Probably Never Heard Of*, BUS. INSIDER (Dec. 2, 2015), http://www.businessinsider.com/what-is-a-yieldco-and-how-is-it-killing-wall-street-2015-11 (explaining generally "yieldcos").

284. *See Master Limited Partnerships Parity Act*, ALL. TO SAVE ENERGY, (Apr. 12, 2016), http://www.ase.org/resources/master-limited-partnerships-parity-act; *see also* Felix Mormann & Dan Reicher, *Smarter Finance for Cleaner Energy: Open Up Master Limited Partnerships (MLPs) and Real Estate Investment Trusts (REITs) to Renewable Energy Investment*, REMAKING FEDERALISM: RENEWING THE ECON. (Brookings Institution, Washington, D.C.), Nov. 2012, at 3–5, https://www.brookings.edu/wp-content/uploads/2016/06/13-clean-energy-investment.pdf.

285. *See* Mormann & Reicher, *supra* note 284, at 3–5 (discussing how REITs could be used to promote clean energy).

also providing benchmarks to help minimize financial risks to mortgage holders.[286]

CONCLUSION

In a similar manner to Elon Musk's analogy between garbage collection fees and a carbon tax, energy law already has begun to look to customer rates to subsidize a transition to a low-carbon grid. Regardless of a national carbon tax's precarious political fate, energy regulators today are pursuing multiple internal subsidy pathways for carbon reduction, albeit in a fragmented manner. Decentralization in these approaches is not unwelcome, insofar as it is flexible and promotes experimentation—benefits that Posner identified half a century ago[287] and that environmental law scholars continue to advocate for today.[288]

At the same time, carbon taxation as regulation has not realized its full potential and could benefit from a critical assessment of its efficacy in advancing efficiency and social welfare in modern interstate energy markets. Regulators approving internal subsidies need to be attentive to neutrality, cost spreading, jurisdictional spillover concerns and notions of fairness and equity (both horizontal and vertical) in setting customer rates. Absent a significant change to federal law, states will continue to exercise primary regulatory authority over the location of power-supply resources and retail customer rates—and much of the action with internal subsidies will occur at the state level. At the same time, federal policies can be used to promote a spirit of innovation among states in the use of internal subsidies to promote carbon reduction and to reduce negative spillover effects associated with state initiatives. The federal government is also uniquely positioned to provide better information about carbon reduction and to leverage consensus that has emerged surrounding internal subsidies and their operation in energy markets.

286. Devashree Saha, *Enact Legislation Supporting Residential Property Assessed Clean Energy Financing (PACE)*, REMAKING FEDERALISM: RENEWING THE ECON. (Brookings Institution, Washington, D.C.), Nov. 2012, at 3, https://www.brookings.edu/wp-content/uploads/2016/06/13-housing-energy-efficiency.pdf.

287. *See* Posner, *supra* note 11, at 45–47 (discussing the advantages of internal subsides).

288. *See* Boyd & Carlson, *supra* note 220, at 880–92 (discussing how decentralization has led to innovation).

Even though adoption of a national carbon tax seems highly unlikely, carbon taxation by regulation has arrived and continues to expand in significance. As regulators address the transition to a low-carbon energy system, continuing to treat internal subsidies for each energy resource in isolation will limit the ability of modern energy markets to efficiently price energy based on its value and promote social welfare. This Article has made a first cut at addressing how internal subsidies can be improved through only incremental tweaks in regulatory approach. By making some of these changes, energy regulators today can make a carbon tax less elusive, advancing its core policies and principles in setting customer rates.